

# COMPUTERWORLD

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## IBM opens data trove to E-model users

BY CHARLES RABCOCK  
CH STAFF

NEW YORK — IBM is launching a new mainframe operating system that builds on its MVS/SP and MVS/XA lines and offers users an 8,000-fold increase in the

virtual memory available for data.

Enterprise Systems Architecture/370, announced here last week, offers a number of innovations that IBM said can be used only by its top-of-the-line, 3090E mainframe buyers. Users

of 3090Es as well as Amdahl Corp. and National Advanced Systems Corp. mainframes predicted that the plug-compatible manufacturers will find it difficult to quickly duplicate the architecture.

The new features include use of expanded storage as a dedicated direct-access storage device inside the CPU, an expansion of virtual memory through a hardware and software innovation called data spaces and data windowing services that allow application users to scroll through large virtual data sets.

Although large IBM customer sites predicted an eventual need for these features, many

managers last week said they are in no hurry to experiment with the operating system until IBM lays out future hardware plans (see story page 112).

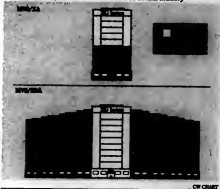
Staged delivery of the operating system reportedly will begin in August, with added functions shipped as upgrades before the end of the year.

Existing applications, particularly large DMS applications, are supposed to run 10% to 12% more efficiently under ESA/370, said Carl J. Conti, vice-president of IBM's Enterprise Systems unit. Some batch processing could even show a performance decrease of 3%, the customer

Continued on page 112

### Change of address

MVS/ESA duplicates the 2G bytes of memory addressable under MVS/XA but can address 8,000 times as much data in virtual memory



## Mainframe shifts gears

BY JAMES CONNOLLY  
CH STAFF

### ANALYSIS

The mainframe — whose critics portray it as a dinosaur helplessly watching the skies for a cataclysmic meteor shower — is being adapted for a new role by its biggest advocate, IBM.

With an eye on the proliferation of powerful workstation and distributed processors that can run user applications, IBM reinforced its effort to redirect the mainframe as a corporate data base machine and network manager rather than as applications processor.

IBM's introduction of MVS/ESA and system-managed storage software were seen as major steps in positioning its

3090 and future mainframes.

The word "enterprise" and the concept of sharing information throughout a corporation were focal points for executives in IBM's Enterprise Systems unit at last week's announcement. The minimal applications orientation focused on how the 3090 and the system software will support distributed user applications that require massive amounts of storage and, for technical computing, the 3090's vector processor.

MVS/ESA was designed to support 16 terabytes of memory while making it easier to manage data in memory or in on-line storage. If that capacity were translated into typewritten pages — at an average of 4,000 bytes per page — 16 terabytes

Continued on page 112

## Pay issue: Women pull a bit closer

BY DAVID A. LUDLUM  
CH STAFF

First the good news: Women in computer professions are narrowing the gap between their pay and that of their male counterparts.

Now the bad news: If you are a woman in data processing, you still earn only about three-fourths as much as a man in a comparable position.

Recent figures from the U.S. Bureau of Labor Statistics show that women in three computer

professions surveyed do better than women in other industries in approaching the pay level of their male colleagues, earning 79% as much as men in comparable positions. That compares with a figure of 70% for working women in general (see chart page 4).

However, the numbers also indicate that women in computing face the same problems as

Continued on page 4

## Ashton-Tate stages Dbase revival

Looks to stave off challengers with better interface, SQL support

BY STEPHEN JONES  
CH STAFF

NEW YORK — Aiming to stop the defection of a disaffected customer base and to revive its waning control over the data base market, Ashton-Tate Corp. announced its long-awaited stage upgrade last week.

Dbase IV, which is scheduled to ship by July 31, will be the first major Dbase enhancement to come out of Ashton-Tate in more than two years. Dbase IV

will sell for \$795 — a \$100 increase over Dbase III Plus — while a developer's edition will be priced at \$1,295.

Rewritten almost from top to bottom, Dbase IV was designed for Microsoft Corp. MS-DOS-based personal computers. However, the developer will also offer a character-based version of the program to run under OS/2 Standard Edition 1.0. A version for IBM's Presentation Manager is being developed, but Ashton-Tate would not forecast a

shipment date.

Ashton-Tate claimed Dbase IV addresses most of the limitations associated with the now dog-eared technology of Dbase III Plus. Features include a full implementation of IBM Systems Application Architecture-compatible SQL, a built-in program compiler that runs 10 times faster than Dbase III Plus and a revamped user interface called the Control Center that includes a new applications generator.

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**Speaking in tools.** Microsoft unveils five enhanced languages and aims tools for writing MS-DOS real-mode and OS/2 protected-mode applications at users who previously had limited access to expensive OS/2 development equipment. Page 8.

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## Quotable

"When it comes to collecting massive amounts of information, organizing it and, most importantly, sharing it across an enterprise, there is no solution that can do it as well."

CARL CONTI  
IBM'S ENTRY SYSTEMS DIVISION

Describing the IBM 3090.  
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## NEWS

# Motorola enters hotly contested RISC business

BY JAMES A. MARTIN  
OF STAFF

AUSTIN, Texas — In an announcement expected to bring added momentum to the growing reduced instruction set computing (RISC) market, Motorola, Inc. said last week it will announce a line of RISC microprocessors this spring.

Motorola's 88000 series, as the RISC line will be called, will contain a primary processor and two cache memory management unit chips, offering 17 million instructions per second (MIPS) performance that will later be boosted to 50 MIPS in parallel processing applications, the company said.

Motorola's RISC entry is expected to give the architecture additional momentum and heat up the competition, analysts said. Currently, only a small number of semiconductor vendors offer RISC chips.

## A lot of RISC

But a variety of proprietary RISC environments exist today in the engineering and technical workstation market, including IBM's RT Personal Computer, Hewlett-Packard Co.'s Precision Architecture HP 3000 series and Sun Microsystems, Inc.'s Scalable Processor Architecture computers.

"Every Tom, Dick and Harry is going to want to do a RISC solution soon," said Michael Kobak, a semiconductor analyst with Kidder, Peabody & Co. in San Francisco.

Intel Corp., for example, reportedly will announce its first RISC-based series, the 8806, consisting of three integrated chips, sometime this spring or early summer, observers said. The anticipated Intel 80486 is not expected to be based on RISC technology. An Intel spokeswoman would not confirm the reports.

"Motorola's announcement is certain to make some of the proprietary RISC companies stop and think if they want to compete in the commercial market," said Alice Leeper, an industry analyst with Dataquest, Inc.

RISC environments from IBM and other vendors are incompatible, and Motorola's announcements bring a new equation into the picture, analysts said. However, users should not be worried about compatibility between systems yet.

"We do have multiple RISC architectures now, but it's still the very early stages of this market, and at some time in the future, we will have one or two dominant architectures that would then have the support of the others," Leeper added.

# Sterling bags buy-out, plans buy-back

BY CLINTON WILDER  
OF STAFF

DALLAS — Sterling Software, Inc. abandoned its proposed leveraged buy-out by management last week but said it will attempt to buy back 50% of its publicly traded stock.

If successful, the \$27 million to \$30 million stock buy-back will accomplish part of what the leveraged buy-out intended — reducing Sterling's exposure to the volatility of the public markets.

Leveraged buy-outs are exceedingly rare in the software industry, but Sterling has pioneered new financial tactics in the past.

Under the shrewd fiscal leadership of Chairman Sam Wyle, the IBM mainframe systems software vendor completed an unprecedented hostile takeover of much larger Informatics General Corp. in 1985.

Sterling spokesman Ray Hanson said management ended the buy-out negotiations last week because of stockholder opposition. "Many stockholders preferred that the company remain publicly owned, but a number of them would like to sell their shares," he said. "That was the mixed input that we had."

## Share offer proposed

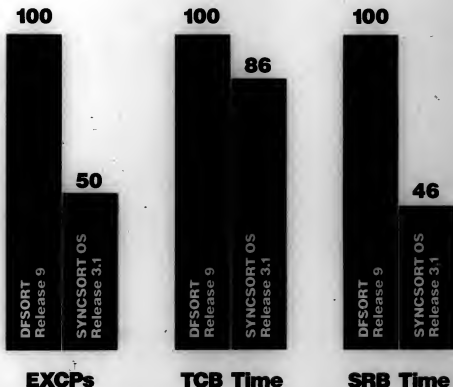
Under the plan announced Friday, the company offered to buy back three million of its six million shares outstanding for a price of between \$9 and \$10 per share. The announced leveraged buy-out had proposed the same price per share.

Before last week's announcement, Sterling's shares were trading at \$8.25 on the American Stock Exchange.

Management insiders currently own about one million shares of Sterling stock. If the stock buy-back plan is successful, less than 45% of Sterling's stock will remain on public markets.

Earlier last week, Sterling reported profits from operations fell 29% to \$1.4 million in the quarter ended Dec. 31. Revenue rose 15% to \$52.1 million in that period.

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## Network links VAX, PC LANs

BY NELL MARGOLIS  
OF STAFF

NEW YORK — Novell, Inc. last week made its Digital Equipment Corp. market debut with Network VMS, a software program it claims can connect DEC VAX users with personal computer local-area networks.

Based on the Provo, Utah, company's Network operating system for PC LANs, Network VMS turns any DEC VAX/VMS into a file and print server for IBM Personal Computers and compatibles, according to Novell. The software uses standard VAX Ethernet controllers to link the minicomputers to PC networks, said David Clare, Novell's Network VMS product manager.

Network VMS interfaces between Microsoft Corp. MS-DOS and VMS file and naming conventions, Clare said, so PC users see files on the VAX server in standard DOS while the files remain standard VMS to VAX users.

In addition, Network VMS lets users running PC-based terminal-emulation software talk to VMS just as they could if the computers were physically hooked into a VAX terminal port, Clare said.

### Support forthcoming

Both Oracle Corp. and Relational Technology, Inc. have announced support for Network VMS; Oracle and Ingres data bases will be available to Network VMS users with the second release of the Novell package, scheduled for shipment in early autumn.

The new software combines Network and VAX security systems and stores all Network VMS files as standard VMS files. The combination gives users the advantage of DEC's backup and archive procedures, Novell explained.

Stated for July shipment, Network VMS server-based prices will range from \$5,500 to \$26,500.

Also attracting attention at Despo East 88 last week was Emulex Corp.'s newly announced Performance 4000 Ethernet terminal server.

The latest Emulex entry, according to the company, is wholly compatible with DEC's Local Area Transport (LAT) protocol. LAT lets a user plug the Performance 4000 directly into an Ethernet network and allows Emulex to position the product squarely against DEC's Decserver 200.

## Apple serves third parties large slice of Mac-VAX pie

BY JULIE PITTA  
OF STAFF

NEW YORK — Apple Computer, Inc. directed the spotlight on its third-party developers during last week's Despo East 88 show, fueling speculation that its relationship with Digital Equipment Corp. may not result in tangible products.

Apple chose to lavish attention on third-party Macintosh-to-DEC VAX connectivity products rather than raise expectations surrounding its own plans with DEC. Some industry observers said Apple's focus on third parties is an indication that its relationship with DEC will result merely in guidelines and standards for independent developers rather than competing products.

"They'll try to endorse standards rather than develop products," said AJ Cini, president of Computer Methods Corp., an end-user consulting firm.

Even independent developers admit that the proliferation of Mac-to-VAX connectivity products has resulted in confusion among users.

"The MIS director is telling us that he'd rather see [connectivity] products from either Apple or DEC," Cini said. "They're

afraid of committing to small companies that could be involved."

### Product parade

The domination of Despo by Apple and its third parties is a reflection of the glut of Mac-to-VAX connectivity products on the market today. Among the product announcements last week were the following:

- Touch Communications, Inc., a Scotts Valley, Calif.-based developer partially funded by Apple, showed Touchterminal, a software product it claimed allows Macintoshes or Microsoft Corp. MS-DOS-based microcomputers to act as terminals to a VAX across a Touch Open Systems Interconnect network.

- Alina Systems, Inc. in Walnut Creek, Calif., introduced Make Easy, a software product for Mac-to-VAX connectivity it said allows the Mac to retain its user interface. Make Easy consists of a server on the VAX and "client software" on each Mac connected to it.

- Blyth Software, Inc. in Foster City, Calif., unveiled Osmia SQL Connectivity Pack, a relational data base product for Mac-to-microcomputer connectivity co-developed with Innovative Solutions, Inc. It includes a server for

the minicomputer and data base software for the Mac. Pricing ranges from \$3,500 for DEC's Microvers II to \$23,750 for a Windows 8978 and an additional \$295 per Mac. Availability is scheduled for mid-year.

• Synoptics Communications, Inc. in Mountain View, Calif., and Kinetics, Inc. in Walnut Creek, unveiled a plan to provide 10M bps Ethernet capability over telephone wire to users of Apple's Macintosh SE.

At a press conference and during his keynote speech, Apple Chairman and Chief Executive Officer John Sculley concentrated on third-party efforts, noting that independent developers have been instrumental in promoting the connection of Macintoshes to VAXs. Apple and DEC's central role will be to establish standards for Mac-to-VAX connectivity, he said.

Third-party developers appeared comforted by Apple's stance. "Apple is giving a clear signal that they're not going to stab their developers in the back," said Ed Forman, marketing director at Network Innovations Corp., a Cupertino, Calif.-based Apple developer. "I believe Apple and DEC will provide enabling technologies for third parties."

Apple and DEC have decided to offer specifics on their joint development agreement, announced last month, except to say that more details will be available in August.

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## Pay issue

FROM PAGE 1

working women in general, including limited advancement opportunities and greater pay discrepancies in the top jobs of their profession.

Analysts offer varying reactions to the findings, which are based on BLS figures for 1987 wages and salaries of full-time employees released this month.

### No visible gap

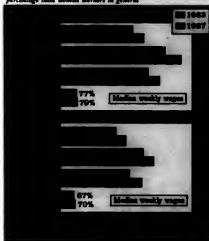
Joseph Bernstein, chief of DP placement for recruiting firm Robert Half International, Inc., said that though he does not disagree with the government figures, a pay gap has not been evident from his placement work.

Steve Joffe, a vice-president at recruiting firm Source EDP, said the gap stems largely from different levels of experience among male and female computer professionals. Men and women with the same experience and skills tend to earn similar salaries, he said. But Joffe also noted that the gap tends to be wider at more senior levels.

Betty M. Vetter, director of the Washington, D.C.-based Commission on Professionals in the Sciences and Technology, agreed that the pay gap for computer professionals increases

### Incremental progress

Women in computer professions continue to earn little more than three-fourths the pay of their male colleagues, which is still a higher percentage than women workers in general.



INFORMATION PROVIDED BY U.S. BUREAU OF LABOR STATISTICS OF DEPT.

with seniority and contended that the gap occurs only partly on account of men's greater experience.

Studies show that men earn

higher starting salaries than women with a comparable education and that they continue to outearn similarly skilled women, Vettors said.

## DEKPO NOTEBOOK

## Top billing for DEC, but Apple steals the show

BY NELL MARGOLIS  
CIW STAFF

The lingering impression of last week's Despo East 88 — the first Digital Equipment Corp. trade show since Apple Computer, Inc. and DEC announced their alliance — was that of two shows: an exciting, SRO display of Apple-to-VAX connections (see story page 4) and one for everybody else.

While crowds thronged Pier 90 of New York's Passenger Ship Terminal to ogle the Apple corps, everybody else played out a pale imitation of Despo past at

neighboring Pier 92. "If the Apple stuff wasn't here," said one longtime Despo attendee, "this show would be an absolute disaster."

The show began on an inauspicious note when, ironically, the computer show experienced problems with its computers. "When we and many other exhibitors arrived to set up, we found that the Expocon computer was down," said Harry Martens, marketing events manager at Cambridge, Mass.-based Compuserve Data Technologies, Inc.

"That caused a big problem for us, because security rules said that we couldn't

get into our booths without our official badges; the badges couldn't be made without the computer," Martens added.

When the locked-out companies finally got their badges and entered their booths, already running a deficit in setup time, they discovered a problem with Alexander Bell's connectivity product.

"There were no phone lines," said James Douglas, national sales and marketing manager for Tampa, Fla.-based Collier-Jackson, Inc. By the time the show officially opened Tuesday morning, Douglas reported, phone lines had been put in, but they were not working. "We plugged in

two modems — nothing."

Complaints to Expocon International, Inc., which organizes the show, brought quick reassurances that "someone would get right on it," Douglas said. But as of midday Thursday — only hours from the show's close — some of the booths that lacked phones from the beginning, including Collier-Jackson's, were still without working lines.

Two companies, which asked to remain anonymous, held a joint press conference and were dismayed to find a lone reporter in attendance. "This is an exciting announcement. Where did we go wrong?" one spokesman wondered aloud. "I know, I know," he answered himself. "We didn't use the words Apple-to-VAX in our announcement."

## Vaxmate prices cut to boost sales

BY GLENN RIFKIN  
CIW STAFF

In an attempt to stimulate lagging sales of its Vaxmate personal computer, Digital Equipment Corp. is set to lower prices of the machine by up to 37% this week.

DEC will also announce further moves to make PC integration easier for its customers with the bundling of a joint license for Vaxmate Client software, now included with every purchase of a Vaxmate. The Decnet/PCSA license was previously priced at \$500.

The client license is needed to take advantage of VAX/VMS Services for MS-DOS, DEC's VMS-layered integrated personal computing software that allows PCs to share files, data and resources with any other user on a Decnet network.

The price for a Vaxmate base system is now \$3,495 — a 26% drop from the original price of \$4,750. When purchased with a VAX or Microvax as the server for a new or expanded local-area network, the Vaxmate price drops to \$3,195, a 33% reduction. In quantities greater than 25, the price drops 37% to \$2,995.

Volume purchases of the IBM PC Network Integration Package will drop from 5% to 37% as well, depending on packages purchased. The full package remains priced at \$1,195 for a single unit but drops to \$753 per unit when 100 units or more are purchased.

## Umbrella marketing

According to John Rose, group manager of DEC's Personal Computing Systems, these moves are part of a series of activities that come under the Network Applications Support umbrella. "The price reductions reflect two things: the competitiveness of the PC marketplace in general and our continuing focus to put our PCs on our VAX ports," Rose said.

DEC will not divulge sales figures on the Vaxmate, but according to industry watchers, the machine has been a major disappointment within the company.

"DEC is just mirroring the downward pricing trend in the personal computer industry," said Michael Millikin, senior editor at Patricia Seybold's Office Computing Group in Boston. "It was foolish to have a 286-based box priced so high in the first place," he added, referring to the Vaxmate, which is based on Intel Corp.'s 80286 microprocessor.

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## Here come the OS/2 applications

BY DOUGLAS BARNEY  
OF STAFF

With IBM and Compaq Computer Corp. playing drum major, a parade of software vendors trumpeted their intentions last week to move applications to IBM and Microsoft Corp.'s OS/2 operating system. But only Informix Software, Inc. and IBM can deliver on their promises immediately, and most applications are still months away.

A "who's who" of micro software vendors who had previously discussed OS/2 support gave shape to these plans, with specifics on products and delivery schedules, at separate Compaq and IBM events.

Informix best data base rival Oracle Corp. to market as it began shipping a full line of relational data base products for OS/2 last week. Oracle had boldly promised to be the first out of the gate by shipping a product on the first day of OS/2 availability; it now plans an April delivery.

Informix is shipping its Informix fourth-generation language development package, the Informix-SQL data base management system, Informix-ESQL, which allows the embedding of SQL statements into C programs, and its C-based indexed sequential access method tool.

Joining Informix in shipping products in OS/2 co-developer IBM, which has begun shipping an OS/2 version of its Displaywrite 4 word processor, the company said last week.

Ashton-Tate Corp. announced Dbase IV, but said it would not be available under OS/2 until later this year (see story page 1).

Microsoft was also active, announcing ports of Multibase and Word to OS/2 Standard Edition 1.0 and a series of language products that support OS/2 applications development (see story page 8).

Other announcements included the following:

- Software Publishing Corp. said its first OS/2 application will be available in the third quarter of this year.

- Barclay International, Inc. announced plans to move its major applications, including its Paradox DBMS, the Quattro spreadsheet, the Sprint word processor, Sidekick Plus, Turbo C and Turbo Pascal, to OS/2 by the end of this year.

- Oracle announced that its OS/2 version of the Oracle DBMS will act as a data base server. The Oracle product, which can also be used on a single workstation, is expected to sell for \$1,295.

## Compaq trumpets MS OS/2 ship

BY ALAN J. RYAN  
OF STAFF

NEW YORK — Compaq Computer Corp. began shipping MS OS/2 Version 1.0 optimized for its personal computers last week and disputed claims from IBM that its Micro Channel-based Personal System/2 line is better suited to run the next-generation operating system.

During a two-hour press conference saturated with support from independent software vendors here, Compaq Chief Executive Officer Rod Canion said a Compaq Deskpro 286 running MS OS/2 in protected mode performs common functions such as calculations, memory access, screen scrolling and random disk access between 17% and 52% faster than IBM's PS/2 Model 60.

Canion added that the Deskpro 386 Model 20 performed each task faster than the IBM PS/2 Model 80-111. Running the same test, a suite of standard

benchmark comparisons Compaq has reportedly used for several years, the performance advantage for the Deskpro ranged from 20% to 62%.

In a standard graphics application, Canion said Compaq's Intel Corp. 80286 and 80386-based systems demonstrated performance advantages of 18% over the PS/2 Model 60 and 31% over the Model 80-111.

### On the bench

An IBM spokesman said the benchmark claims appear to be exaggerated. "There are many ways to do benchmarks," the spokesman said, "and you can easily set them up to produce the type of results you want." He added that IBM uses the independent National Software Testing Laboratory "to produce fair, unbiased results."

A Compaq spokesman said that although OS/2 and MS OS/2 are very similar, the Compaq hardware makes the software run faster on Compaq machines.



Compaq's Canion

Analyst Peter Lab, a vice-president at Drexel Burnham Lambert, Inc., said Compaq's benchmarks are not very relevant to its MS OS/2 announcement. "The 386 is so fast that I'm not sure anyone could tell the difference [between one machine and another] anyway," Lab said.

He said a more important issue is IBM's attitude that vendors that do not have the Micro

Channel architecture will not find a market for their products in corporate America within two years. "It may be that we'll have a two-standard market," with both Micro Channel and industry-standard architectures, Lab said.

Melinda Reach, a vice-president at Merrill Lynch & Co., predicted that most users will wait until the graphical user interface is available before purchasing OS/2.

Compaq is the third company to ship the operating system. IBM released OS/2 Standard Edition 1.0 Dec. 4, and Zenith Data Systems started shipping MS OS/2 Dec. 18.

Following the briefing, 21 independent software vendors assembled to display products running under MS OS/2. The products tested included data base, communications and applications programs.

The operating system is available from Compaq dealers and is priced at \$325, the same price point as IBM's OS/2. Buyers receive both 5¼- and 3½-in. disk versions in the package, Compaq said.

## Dbase

FROM PAGE 1

Although a demonstration of the program here was temporarily stalled because of a bug in the software, analysts who saw Dbase IV gave it an initial round of high marks.

"They paid a lot of attention to meeting the concerns of the development community; it's clearly faster, and the interface eases the work of the end user," said Bill Higgin, director of software research for Cupertino, Calif.-based Infocorp.

The Control Center interface was designed for nonprogrammers and provides pull-down menus with cursor-selectable command options as well as a what-you-see-is-what-you-get screen display. It also lets users perform data entry, query and report generation without writing programs.

### Ties that bind

An analyst who is familiar with the product reported that the SQL implementation gives Dbase IV the connectivity needed to tie into multitier operations running on a data base server. Such a software server, called the SQL Server, was recently announced by Ashton-Tate and Microsoft.

If linked to an SQL-based data base server, Dbase IV would allow PC users to access relational data on the server, while providing transaction management, record and field-locking capabilities and data rollback and recovery.

The question now is whether Ashton-Tate has kept its cus-



Dbase IV features multiple windows for editing and execution

tomers waiting too long for this fresh Dbase technology. Botched development plans, reports of dissension among programmers at the firm and a daunting 350,000 lines of new source code have delayed the release of the product since last summer.

The lack of upgrades and a code of silence from Ashton-Tate executives on new product specifications led many frustrated users to move to alternative software from such Dbase clone-makers as Nantuckit Corp. and Fox Software, Inc.

Although Ashton-Tate claimed Dbase IV will win back many of these unhappy customers, users said they have found the Dbase name is not necessarily analogous to leading-edge technology.

"If Ashton-Tate comes out with a faster version of Dbase, it warrants a look, but we won't move over until we test it and

see how it matches up to what we have," said Kuen Ling, a Metropolitan Life Insurance Co. project manager whose staff has switched to Nantuckit's Clipper to compile Dbase code.

Ashton-Tate hopes to hold onto its installed base of nearly two million Dbase users by helping them move into the multitier data base environments of the future.

Dbase IV allows existing Dbase code to access the SQL Server developed jointly by Microsoft, Sybase, Inc. and Ashton-Tate (CW, Jan. 18) as well as some modified Sybase data base management system products, according to Roy Folt, Ashton-Tate's vice-president of software products. Applications written exclusively in Dbase IV can be compiled and extract data by any DBMS using ANSI-standard SQL, including IBM's DB2 and Oracle Corp.'s Oracle.

Folt admitted that the trans-

lation process does result in a noticeable decrease in the program's performance. But Richard Finkelstein, senior consultant with Cold and Date Consulting Group in Chicago, said upward compatibility is worth the trade-off in performance. "Dbase IV provides a migration path for users who want to get to SQL but don't want to throw out the applications they already have," he said.

Dbase IV can send complete SQL calls to the server if a new application is developed in the Dbase/SQL language or if existing Dbase code is recompiled.

### Take that

Ashton-Tate took a swipe at the competition during last week's announcement, saying Dbase IV would be able to compete across three major areas of data base technology. Software developers that have taken market share away from Ashton-Tate in these segments include the following:

- Borland and Microwin, Inc., which market relational data base products with easy-to-use interfaces.

- Nantuckit and Fox, which specialize in Dbase clones.

- Oracle Corp. and Informix Software, Inc., which pioneered SQL technology on minicomputers and sell similar programs for PCs.

Analysts warned that Ashton-Tate might have trouble taking on anyone if it does not adhere to its already late release schedule.

Users who buy Dbase III Plus between now and July 31 can upgrade to Dbase IV for \$30, while all other Dbase owners can buy the product for a \$175 upgrade fee.

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# Honeywell Bull revamps 7000s

Three air-cooled multiprocessors protect data during power outage

BY JEAN S. NOZMAN  
CHICAGO

**MINNEAPOLIS** — Honeywell Bull, Inc. last week announced three high-end models for its 10-month-old DFS 7000 family, each of which is roughly equivalent in power to an IBM 4381 processor.

Designed as upgrades for the 3,500 Honeywell Bull GCOS 7 systems worldwide, the three air-cooled models are multiprocessors with redundancy features to protect data in the event of a power outage or component failure.

22, 23 and 24. Honeywell Bull spokesman said.

The top-of-the-line Model 92 delivers double the power of the \$11 million Model 50, the former high-end machine, and can support 121,000 transactions/sec. for more than 2,000 users. The Model 72 can be field-upgraded to the other two models.

## 4381 competitor

Honeywell Bull managers said the company can compete against the 4381 by stressing the GCOS 7's ease of use vs. that of IBM's MVS/SP operating system and the DFS 7000's multi-

being installed at a Boston-area supermarket that owns an older Level 64 and a DFS 7, the company said.

"These new DFS 7000 models will help several DFS 7 users I know who are topping out on their systems," said Shirley Eick, president of the North American Honeywell Users Group, Inc. "This will give them a growth path that is completely compatible with their GCOS 7 systems."

Eick noted, however, that U.S. customers "aren't necessarily driving the changes coming along in the DFS 7 line; Euro-

## Compagnie des Machines Bull

Among the system's features are multiple CPUs, an enhanced version of the GCOS 7 operating system with improved recovery features and redundant disk drives.

## Most fault tolerant

However, Honeywell Bull spokesman stopped short of touting the features fault tolerant. "All the subsystems are completely redundant," said Maurice Gervais, director of medium systems marketing for Honeywell Bull in the U.S. "They have dual power supplies, dual consoles and a reconfiguration capacity that allows the system to operate if any component should fail."

However, Gervais cautioned against running the systems in mirror image, saying that is an expensive way to achieve fault tolerance.

Nikko Securities' Geras noted that "the redundancy features appear to address IBM's fault-tolerant features."

Gervais said that the company was delivering high system availability at the request of many GCOS 7 users.

The DFS 7000's improved personal computer support was provided through a license agreement with Montreal-based Micro Tempus, Inc. for its Tempus-Link product.

"Tempus-Link will support any MS-DOS-based personal computer," Gervais said, referring to Microsoft Corp.'s PC operating system.

Honeywell Bull also announced the Distributed Office Automation Services system, a downsized version of the DFS 7000 Matrial test retrieval system already used in France.

# HP reports 54% rise in profits

BY CLYTON WILDER  
NEW YORK

**PALO ALTO, Calif.** — In another sign of the computer industry's relative strength in an uncertain economy, Hewlett-Packard Co. reported impressive financial results last week for its first quarter ended Jan. 31.

The minicomputer and scientific instruments vendor posted a 54% rise in profits on a 26% increase in sales, compared with year-earlier levels. But most encouraging was HP's rate of new orders, which were the highest of any quarter in the firm's history. President and Chief Executive Officer John A. Young said in a statement. New orders totaled \$2.44 billion, a 36% growth rate over orders in the comparable quarter a year earlier.

HP's announcement followed solid results for most minicomputer makers, including Digital Equipment Corp., Wang Laboratories, Inc., Prime Computer, Inc. and Data General Corp. in the quarter ended Dec. 31. The trend indicated industry strength in the period immediately following the Oct. 19 stock market crash.

HP reported revenue of \$2.19 billion, up from \$1.74 billion a year earlier. Profits grew from \$116 million, or 45 cents per share, to \$179 million, or 71 cents per share.

## Filling out the middle

Three new models extend Honeywell Bull's DFS 7000 mid-range line



1 Millions of instructions per second; CW estimates based on vendor-supplied information.  
2 Sample configuration including storage, printers and front-end processors.

INFORMATION PROVIDED BY HONEYWELL BULL, INC.  
CHICAGO

The DFS 7000 Models 72, 82 and 92 push DFS 7000 performance past that of the series' first five models, announced in April 1987. The new models range in price from \$731,000 to \$1.94 million for power levels spanning the IBM 4381 Models

processor architecture vs. uniprocessor versions of the 4381.

However, industry analysts said the machine is more likely to be purchased by existing DFS 7 users than by IBM sites.

The first DFS 7000 Model 72 shipped in the U.S. is currently

pen users are doing that."

"It seems that Honeywell Bull is buried in the French company that owns part of it," said Mike Geras, an industry analyst with The Nikko Securities Company International, Inc. in New York, referring to Paris-based

# Microsoft unwraps OS/2 languages

BY STEPHEN JONES  
CHICAGO

**SAN FRANCISCO** — Microsoft Corp. continued to stoke the OS/2 fires last week, announcing a family of development tools that it said can be used to write both MS-DOS real-mode and OS/2 protected-mode applications.

At a developer's conference here, Microsoft unveiled five enhanced languages, a reconfigurable multitask editor, an enhanced Codeview debugger and a handful of other utilities. The only language missing from the announcement was Cobol, but the developer said an enhanced OS/2 version would be released soon.

The tools are aimed at appealing to a broad base of corporate developers who, up until now, have had only limited access to expensive OS/2 development tools. Microsoft has said early releases of an OS/2 developer's tool kit that include a C compiler

for OS/2, but the package costs \$3,000. The OS/2 languages announced last week will cost the same as current MS-DOS releases, the company said.

"It doesn't do much good to have an operating system if you have no tools to write applications for it," said Bob Bierman, a senior programmer with the Living Videotext, Inc. division of Symantec Corp., which has been tested most of the Microsoft languages.

But Bierman downplayed the announcement, noting that most of the new compilers show little improvement except that they can work under both the MS-DOS and OS/2 operating systems.

## No breakthrough

Bill Higgs, director of software research at Infocorp, agreed. "It's another step in giving developers another piece of what they need, but it doesn't represent a tremendous break-

through," he said.

Microsoft's C Optimizing Compiler 5.1 and Fortran Optimizing Compiler 4.1 cost \$450 each. Pascal Compiler 4.0 costs \$300, Basic Compiler 6.0 costs \$295, and Macro Assembler 5.1 costs \$150. The Basic, Fortran, Macro assembler and Pascal compilers will ship by March 31, and the C compiler will ship by the end of April, the company said.

The new tools allow development for three environments: OS/2 and MS-DOS-specific and family applications.

Applications written in the latter dual mode can run under either OS/2 or MS-DOS but offer inferior performance and functionality because they were not written specifically for OS/2. Such applications would typically be limited to basic setup and utility-type programs, said Steve Ballmer, vice-president of software development at Microsoft.

As a software developer, Bierman said he has little use for

## Speaking in tongues

Microsoft will roll out a first of MS-DOS- and OS/2-compatible languages during the next three months



INFORMATION PROVIDED BY MICROSOFT CORP.  
CHICAGO

such dual-mode applications. "With most applications, end-user performance is too critical to sacrifice by using the family mode," he said.

## Eight windows open

Each language is bundled with a number of utilities, including Microsoft Editor, which allows up to eight windows and multiple files to be open at one time running multiple languages. An enhanced Codeview debugger allows users to view data structures and follow linked lists

and nested structures.

Microsoft also announced the OS/2 Programmer's Toolkit, which provides more than 900 pages of OS/2 documentation.

The tool kit reportedly will be available April 30 for \$350. While the OS/2 languages will be enhanced to work with subsequent versions of the operating system, Ballmer predicted that the bulk of applications for OS/2 Standard Edition 1.1, the so-called Presentation Manager, will be written with tools announced last week.



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## NEWS

### E. F. Hutton files move uptown

Shearson Lehman packs Hutton account info into central complex

BY ALAN ALPER  
OF STAFF

NEW YORK — Shearson Lehman Brothers, Inc. last week completed the first phase of a six-month project to automatically transfer data from E. F. Hutton & Co.'s two data centers in downtown Manhattan to its Information Services Center one mile uptown. The data transfer is occurring as Shearson navigates the final steps of its \$1 billion acquisition of Hutton that is expected to close later in the quarter.

During the recent President's Day weekend, Shearson transferred about 45% of Hutton's customer account information into its own mainframe complex, according to Gary Hegedus, vice-president of systems programming at Shearson. Although unable to quantify the data, he said the customer information originated from 125 of Hutton's 400 worldwide offices.

"There are thousands of customers and many positions within each portfolio," Hegedus explained. "A customer file could contain 15 different stocks with 15 positions within each."

#### Out with the old

As customer information is moved to Shearson's systems, Hutton's offices are switching from age-old Bunker Rame Information Systems terminals to a mix of IBM 3270 workstations and Personal System/2s that can communicate on Shearson's network via remote controllers and modems.

The objective is to integrate Hutton into Shearson's centralized information network and make effective use of the massive processing capacity of Shearson's IBM mainframe complex (CW, Dec. 14, 1987).

As the data transfer process continues, Shearson is still wrestling with the question of whether to move Hutton's two IBM 3090 Model 400s to its complex once the data transfer project is

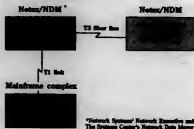
completed, since Shearson recently upgraded its own IBM mainframe configurations.

Shearson certainly has the room in its nine-story 732,000-sq-ft facility to accommodate the Hutton hardware. The firm is also building a 14-story addition next door in which it will consol-

work was done in the window between its daily on-line and batch processing cycles, Hegedus said. Transmission was eased using a communications software subsystem from The Systems Center, Inc. called Network Data Mover (NDM), which transfers data directly from source to des-

#### Merged identity

The acquisition of E. F. Hutton by Shearson Lehman Brothers requires a variety of communications links to tie the new company's information systems.



\*Network System's Network Data Mover and The Systems Center's Network Data Mover

data all operations personnel.

"We have to see what is salvageable, and that relates to Hutton's [computer] losses," Hegedus said.

Hutton brokers at the initial 125 offices that were converted to the Shearson network were able to access customer information the morning after the three-day holiday weekend, Hegedus claimed.

The balance of Hutton customer data will be moved to Shearson's IBM mainframe complex in either one or two stages, Hegedus said. The entire project is scheduled to be completed by the end of June.

Within weeks of making its acquisition offer, Shearson began moving Hutton's branch data, including brokers' commissions, to its IBM mainframes over T1 links at 1M bytes/sec. (see chart above). Much of the

tion files without intermediate staging or spooling.

The firm has been sending more than 125 files a night from the Hutton systems to Shearson. Some of the files contain one million to two million records, Hegedus said. To accommodate the additional data, Shearson added 14 strings of IBM 3380 direct-access storage devices, bringing total on-line storage capacity to more than 1 terabyte, Hegedus said.

Shearson is using Network Systems Corp.'s Hyperchannel and Network Executive, more commonly known as Netex, to achieve the 1M bytes/sec. data transfer speed. "It's not channel speed, but it's up there," Hegedus said, noting that the Hyperchannel adapter is the limiting factor.

As 24-hour global trading makes increased demands on the company's systems capacity, Shearson's MIS department has had to make sure its on-line system comes up earlier than it did before. To fit the daily data transfer work into a tight processing schedule, MIS has to look carefully at job scheduling.

Hutton has been using NDM to transmit data between its primary and backup data centers for the last few years, Hegedus said. The firm has a T3 fiber line running 1,200 ft between its two data centers to facilitate high-speed data transfer and stricter controls. Shearson had been using a competing product marketed by IBM, called Bulk Data Transfer, to move large amounts of data.

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This chart is based on the IBM PC XT, AT, and PS/2; IBM 370/30xx/43xx and compatible mainframes; Digital Equipment Corporation's VAX™ series minicomputers and workstations; Data General Corporation's BCL/P680 MV series; and Prime Computer, Inc.'s 50 series. Not all products are available for all operating systems.

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## Siemens supports ISDN

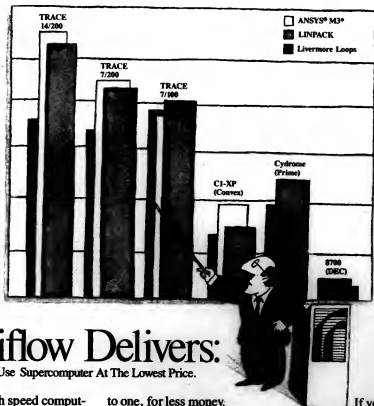
The other leading PBX makers have "no vested interest" in providing a generic interface that allows other vendors' equipment to be attached to their PBXs, Nolle said.

## Alliant to acquire Raster

Mundie claimed the acquisition will have "no real substantive effect" on Alliant's deal with Apollo Computer, Inc., in which Apollo resells Alliant systems as computational processors for its workstations.

## Host Storage & Retrieval

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# AT&T reveals multivendor net specification

Network Management Protocol defines common set of standards for vendors' systems

BY ELISABETH HORWITT  
CW STAFF

**BASKING RIDGE, N.J.** — AT&T's still-embryonic multivendor network management system moved one step toward maturity last week with the release of specifications that reportedly allow it to communicate with other vendors' network management products.

However, industry perception of AT&T's Unified Network Management Architecture (UNMA) as mostly vaporware continues to cloud its hopes of chal-

lenging IBM's Netview as a de facto industry standard.

AT&T's newly released Network Management Protocol, or NMP, defines a common set of protocols through which different vendors' network management systems can communicate with a single UNMA-compatible network management workstation, according to AT&T spokeswoman Ruthly Newell.

The protocol will allow the telecommunications vendor's network management system to monitor and configure multiple multivendor networks from a

centralized location, Newell added.

AT&T is currently "having a lot of discussions with vendors about their supporting NMP," Newell said. However, no vendors have announced support of the protocol to date.

**They needed it yesterday**

AT&T needs to solidify UNMA specifications and sign up vendors to support the architecture as soon as possible in order to counteract IBM's drive to make Netview an industry standard, according to Jeremy Frank, a program director for en-

terprise network strategies at the Gartner Group, Inc. in Stamford, Conn. "AT&T really had to do it yesterday," given IBM's rapid extension of the Netview umbrella, Frank said.

AT&T is one of several vendors that Eastman Kodak Co. is considering in its quest for better ways to manage its extensive multivendor network installation, according to Alan Chase, manager of research and technical planning for Kodak's computing and telecommunications group. "But UNMA seems more visionary than real, and we have to provide an acceptable level of service now," Chase said.

NMP conforms to the four upper layers of the Open Systems Interconnect communications standard, AT&T said.

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19.2 Kbps	2192A SA/MM	N/A <sup>2</sup>	N/A <sup>2</sup>
14.4 Kbps	2144A SA/MM	N/A <sup>2</sup>	N/A <sup>2</sup>
9.6 Kbps	2096A SA/MM 2096C SA/MM 2096T SA/MM 2296A SA/MM	2296A SA/MM	2596 SA & MM 2696 SA & MM 2796 SA & MM
4.8 Kbps	2048A SA/MM 2048C SA/MM 2048T SA/MM	2248A SA & MM	↓
2.4 Kbps	2024A SA/MM 2024T SA/MM	4024 SA 2224A <sup>(2)</sup> MM 2224B SA 2224E MM 2224CEO SA 2224G MM	
Dial Backup	48E SA 48F SA 839A MM 839B SA 2296A <sup>(2)</sup> SA/MM	N/A <sup>2</sup>	N/A <sup>2</sup>

Note: (1) Some modems SA/MM (stand-alone or multiple inline), separate modems SA & MM (stand-alone and multiple inline).  
(2) 2556 series asynchronous transmission at 0-300 bps, 1200 and 2400 bps, and synchronous transmission at 1200 and 2400 bps.  
(3) 2296A has ability to automatically back up 4-data private line with a single switched network connection.

\*Not applicable

What you are looking at, in matrix form, is the AT&T DATAPHONE II family of modems. The widest range of modems in the telecommunications industry.



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## Sprint drops EDS as partner in FTS-2000 bid

BY ELISABETH HORWITT  
CW STAFF

**U.S.** Sprint Communications Co. filed Electronic Data Systems Corp. (EDS) last week as its partner in a joint bid for FTS-2000, a multibillion-dollar contract to build a telecommunications network for the federal government.

"Sprint contacted us, saying that they have decided to go it alone," EDS spokesman Mark Fox said. "My impression is that they may pick up another partner." EDS, for its part, will not bid on its own for the contract, according to Fox.

The split resulted from "some differences in the business relationship" between the General Motors Corp. subsidiary and the long-distance carrier, Fox indicated.

Sprint would not comment on the situation beyond saying that it is still evaluating the FTS-2000 request for proposal (RFP).

**Not as money maker?**

"When a deal of this magnitude falls apart, someone has decided they won't be making money on it," said Thomas Nolle, president of Haddonfield, N.J., consulting firm CDMJ Corp.

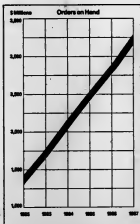
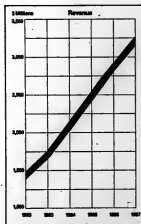
The most likely bone of contention, Nolle said, is the allocation of responsibility for "ongoing support, making changes — the costs that make a proposal dangerous because they are hard to estimate up front." Negotiating such arrangements becomes "tougher when you have two organizations with a lot of power and ego," he added.

The EDS-Sprint partnership announced its intent to re-enter the FTS-2000 bidding earlier this month, following the U.S. General Services Administration's (GSA) agreement to its request to divide the contract between two bidders. According to the GSA's final RFP, released late in January, one bidding team will provide telecommunications networking for 60% of government agencies, the other for 40%.

The other major bidders on the contract are Boeing Computer Services Co. partnered with AT&T and the team of Martin Marietta Corp. and MCI Communications Corp.



# Once again, our lines align



The lines demonstrate a consistent record of stable, long-term investment and growth that could serve as a model for any corporation, anywhere in the world. But one doesn't necessarily have to be a financial wizard to see the reason behind it. It's right there in the charts.

Compare the charts for revenue, capital expenditure, and personnel. It's no accident that they are virtually congruent, reflecting the fact that our investments have faithfully kept pace with revenue growth, year after year.

These investments have paid off, in a way that will profoundly affect next year's figures, too.

Take a look at the chart at the top right. It represents "Orders on Hand." Their value, at the start of the new fiscal year, which began on January 1, 1986, is equivalent to that of last year's revenue.

We continue to invest aggressively in personnel, plant, and R&D. We increased personnel by 15% last year, adding 3,900 new people, including 800 in our applications software division. This personnel investment strengthens our position as a solution-oriented supplier of information technology. One fact alone highlights this: We now have 4,300 people producing applications software.

In purchasing Nixdorf solutions, our customers have enjoyed the benefits of many significant technology breakthroughs, new and improved products. We have been growing worldwide, have opened offices in these more countries

this year (bringing the total to 47 countries) and have substantially expanded our operations in several important existing markets.

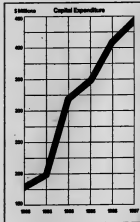
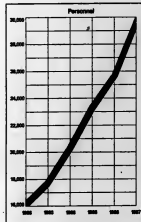
The substantial investments in 1987 are designed to strengthen the strategically important divisions that are taking the company into growth markets.

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## Vendors learn to respect referential integrity

EFREM MALLACH



Take a survey of data base administrators. Ask what pains them. Along with dentists, the Internal

Revenue Service and arthritis, referential integrity will come up often. It's a real problem. But fortunately, data base management software suppliers are finally beginning to do something about it.

A data base has referential integrity if it "hangs together." Every invoice, for example, refers to a customer in the customer file. Every part number refers to a real part record. Every employee is in a real department, and so on.

Referential integrity is lost when a parent record is deleted

**R**EGARDLESS of how it might happen, the data base administrator is supposed to make sure it does not happen. His neck is on the line if it does.

but all of its children are not. For example, a customer's record might be deleted while there are still outstanding invoices for that customer. This situation can occur by accident or sometimes result from collusion between the customer and the supplier's data processing staff.

Regardless of how it might happen, the data base administrator is supposed to make sure it does not happen. His neck is on the line if it does.

### Prime suspects

Referential integrity is primarily a problem with relational data bases. A network data base uses pointers that make it easy to determine if a customer has outstanding invoices and to prevent deleting the customer's record if he has bills to pay.

A relational data base lacks these pointers. One cannot find out, just by looking at the customer's record, that invoices for the customer exist. To do so, one must check all invoice records to

see if there are any with the customer number in question.

Checking isn't very time consuming if the data base is properly organized with invoices indexed by customer number, but it's an additional step that's easy to omit.

The lack of pointers contributes greatly to the flexibility of a relational data base. Flexibility, unfortunately, is also the flexibility to do things wrong and to get into trouble.

Referential integrity is just one manifestation of this problem. The others are aspects of the central issue: the ability of a data base management system (in the most general sense of the term "system") in this case, including the data base administrator) to enforce business rules in the data base.

The alternative to central enforcement is to require every transaction to check for violations of every possible business rule that might affect it. Even when transactions are developed by professionals, this requirement is difficult to enforce and creates a massive maintenance problem when business rules change.

### Help's on the way

Vendors are beginning to help. Products exist today that enforce business rules in two ways. One approach used by some suppliers — most prominently, Sybase, Inc. in Berkeley, Calif. — is to add business rules to data definitions.

Sybase uses "triggers" attached to data element definitions. A trigger is a small program activated when a data element is accessed, deleted or modified. A trigger activated by an attempt to delete a customer record can scan the invoices and prevent deletion if an open invoice exists.

Triggers can also enforce any other business rule; for instance, one that states no employee may be hired at higher than the midpoint of the applicable salary range.

A second approach checks the data base periodically to ensure that business rules are not violated. SQL-Verify from Intex Systems, Inc. in Wellesley, Mass., works on IBM SQL/DS data bases. If there are any customer numbers in the invoice file that do not appear in the customer file, the program can produce a list.

In the process, it can also produce a list of duplicate customer numbers in the customer file and of several other things that might go wrong with a data base. By selecting a suitable set of

Continued on page 24

## Friends and foes join to build PCs

Lift the veil and find a map of the world, from Singapore to El Salvador

CHARLES P. LECHT



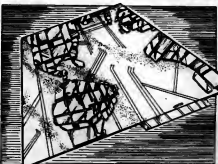
While replacing a board in one of my personal computers, my attention was drawn to a chip that bore the

words "El Salvador" and the logo of Texas Instruments, revealing the country and company of origin. This bit of information led me to wonder how many other countries and companies had contributed to this PC's manufacture.

16 companies. The countries included Japan, Singapore, Malaysia, Taiwan, South Korea, Indonesia, Australia, the Philippines, El Salvador and the U.S.

The company symbols were not easy to decipher, but I recognized those of Motorola, Intel, IBM, Fairchild, Hewlett-Packard, Nippon Electric, TI, National Semiconductor, Advanced Micro Devices, Beckman Instruments, Yokogawa Electric, Hitachi, Siemens, Fujitsu, Electronic Associates and AST Technologies.

Some of the companies were



NEC SCULPTOR

Without checking every component, but having removed just a few boards, I managed to come up with at least 11 countries and

Lecht is an IDG News Service foreign correspondent based in Tokyo.

operating in several of the countries, the notable example being TI, whose logo I found on components from at least five countries.

Included in the overall country list are nations harboring

close manufacturers as well as legendary computer industry foes such as IBM, Fujitsu, Hitachi, NEC and Intel — competing and cooperating at the same time. Omasahara (Japanese for "interesting"), I thought.

Exploring the computer origins of the first machine led me to lift the bonnets of several other systems, each produced by a different manufacturer, either Japanese or American. They all sported a similar country and company mix.

Don't let them fool you. Densitron computers, vendors don't seem to be manufacturing much of what they sell anymore, but don't be misled by this observation. Just as the conductor of a symphony doesn't make the instruments used to play a work, the results always differ, depending on who's conducting.

What differences can we expect between systems offered by different manufacturers using basically the same components? Except for manufacturers that are just plain copying, the system design is always unique. So is the quality of manufacture, reliability and serviceability of the end product.

In addition, factors like the availability of a large software library, training materials, documentation and applications know-how differ within each manufacturer's environment. Often, vendors cut costs in these areas and offer fallacious savings.

Continued on page 24

## Productivity finds another miracle cure

MICHAEL SULLIVAN-TRAINOR



One morning, an MIS manager awoke to find that his researchery had discovered the cure to all of his productivity headaches.

A radio announcer said, "Scientists reported today that a select group of Cobol programmers who had inserted a GOTO statement for every other line of code increased the chances of achieving optimal productivity by 99.8%."

Switching off his clock radio, the manager picked up the telephone to call his development chief. He knew his staff had been using GOTOs every once in a while when they needed them, but they certainly weren't using them as every other line of code.

Sullivan-Trainor is a Computerworld senior writer.

The possibilities were mind-boggling.

"Hello, Dick. Did you hear the news? I want everyone putting GOTOs in their programs, starting today," the manager told him.

"But that's totally against the philosophy of structured programming," Dick complained. "Besides, we don't know whether that research involved novices, lachars or what. The results might be different, depending on what group is exposed to the GOTOs."

"I know," the MIS manager said. "Let's try it with that new personnel application anyway."

"You mean the one we used a code generator and CASE system out? The one we're thinking of switching from Cobol to Natural? The one that's a prototype for our new methodology?" Dick asked.

"That's right. If this works, we can toss out all those tools I never understood anyway and

save ourselves some real money," the manager said, then hung up.

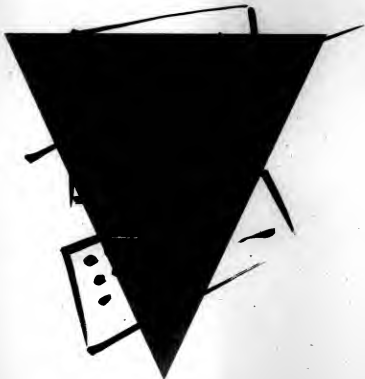
A week later, selective use of GOTOs had brought about significant productivity improvements at the shop but only with certain parts of the application written by highly experienced programmers using a more efficient compiler.

### Fourfold falls flat

After studying front-page stories in all the trade papers and even the leading business publications, the MIS manager realized that this alleged cure-all was just another partial productivity aid receiving its usual introduction into the world.

"Looks like it's back to the drawing board," the disappointed manager said to his development team.

"Maybe not," Dick said. "I just heard that Bell Labs researchers are achieving amazing results with Basic for production applications."



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## Integrity

CONTINUED FROM PAGE 21

rows to check, a data base administrator can enforce other rules; for example, one that forbids quoting items that are neither in stock nor expected within 30 days.

### Prove and convey

There are several issues to consider in choosing between these two approaches. One pragmatic issue is the environment. Sybase's DBMS runs on minicomputers and microcomputers, not on mainframes. Conversely, you can't buy SQL-Verify for anything but an IBM mainframe: SQL/DS under VM today, DB2 under MVS soon.

But these limitations are temporary. The range of products that address data base integrity needs is growing. Research projects, such as Postgres at the University of California at Berkeley (a follow-on to the work that produced Ingres), are pursuing this end vigorously. Most major DBMSs will soon support either static or dynamic checks, directly or via third-party add-ons.

A second consideration is ease of recovery from a problem if it is detected after the fact. Many product systems do not actually delete records but, instead, flag them as inactive so that their information is retained and can be used for reporting.

When this approach is used, a deleted customer record can often be restored the next day with no real loss. Periodic checks will do quite nicely in these situations. When deletion or other errors can have instantaneous, permanent and unrecoverable effects, dynamic checking is more suitable.

A related factor is the frequency with which one expects problems to occur. If users are untrained, potentially malicious (as the general public) or otherwise untrustworthy, dynamic checking of every transaction may be worth the effort.

The same is true if the data base can be modified via transactions developed by end users, since forcing them to code business rules into every transaction is not practical. If users are more controlled, periodic checks are more likely to suffice.

There is also a hardware capacity and response time trade-off. Checking each

transaction requires resources, slows responsiveness or both. Periodic checks that are run during slack times do neither. Using periodic checks can postpone an expensive upgrade or permit use of a system somewhat than what might be called for otherwise.

With mainframe performance, measured in millions of instructions per second (MIPS), being comparatively costly and minicomputer and microcomputer MIPS

less so, both Sybase and Inter Solutions may well have chosen the optimal approach for the environments they support.

What should users do about referential integrity? Recognize the problem, of course. Decide between the varying conceptual approaches and buy or write software that supports the chosen approach. Then, at last, data base administrators can relax.

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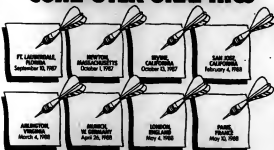
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# SOFTWARE & SERVICES

## SOFT TALK

Rosemary Hamilton

### Can IBM be a Unix player?



While IBM's commitment to Unix is to be commended, the company also shows signs that it has a way to go before it really plays the open systems game.

First, the positive side. IBM helped both its users and the Unix market by finally presenting a lucid Unix picture. Prior to the Uniform 1988 trade show, held earlier this month in Dallas, IBM's position on Unix was about as clear as pea soup.

IBM was offering a variety of Unix versions, and there was no real indication as to which one was more strategic than the others. What's more, none of those versions were included in IBM's master plan of Systems Application Architecture (SAA). So did that mean none of the Unix versions were destined for a great future?

Then there was the newly created AIX workstation family, featuring the RT Personal Computer, which has had a dark cloud hanging over it since its introduction two years ago. Was IBM going to make this product strategic? Or was the company merely re-labeling a troubled product line?

Robert Ackerman, who represents X/Open in the U.S., says that IBM's position on Unix has been intentionally vague.

"If they wanted to be articulate about it, they would be," Ackerman says.

*Continued on page 29*

## Object-oriented systems emerge

Early versions considered predecessors of '90s mainframe systems

BY CHARLES BARCOCK  
CW STAFF

BEAVERTON, Ore. — Two small companies are in the final stages of bringing out general-purpose, object-oriented information management systems, a technology that deals with data in more complex forms than traditional data base management systems.

Initially written for workstations and the Digital Equipment Corp. VAX, the products are seen as the forerunners to the mainframe systems of the 1990s. Cullinet Software, Inc., producer of IDMS/R, and sever-

al other major software houses are believed to have development projects under way to add object-oriented features to their mainframe products.

The computer-aided design (CAD) community has experimented with object-oriented information systems for three years, but a more commonly recognized example of object-oriented programming is the user interface on the Apple Computer, Inc. Macintosh, on which the click of an icon opens a file.

"A file in an object-oriented environment does not need to receive a script from a user to activate a file. The same way that a

stage director cues an actor, a user can invoke an object that knows what it is supposed to do," said Randall P. Sutherland, a research analyst at Datquest, Inc.

Servio Logic Corp., a 25-employee firm in Beaverton, and Ontologic, Inc. in Billerica, Mass., a 45-employee outfit, are the youthful pioneers. Servio Logic said its system, Genetone, is available immediately on the VAX with a system scheduled to follow in the second quarter for Sun Microsystems, Inc. workstations. Ontologic said its system, Vase 1.0, has been in use

*Continued on page 30*

## IDMS/R ships out with SQL

BY CHARLES BARCOCK  
CW STAFF

WESTWOOD, Mass. — Cullinet Software, Inc. recently began shipping IDMS/R Release 10.2, its mainframe data base management system with limited SQL support.

Meanwhile, the company said it will begin beta shipments of the next release of IDMS/R, which will have additional SQL support, in the first quarter of 1989.

Release 10.2 of IDMS/R has the ability to process SQL queries. Another feature of the mainframe hierarchical DBMS is the ability to take advantage of multiprocessor CPUs, according to the company.

Cullinet Executive Vice-President David A. Litwack said about one-third of Cullinet's customers make use of large IBM machines such as the 3090 group.

**Release 10.2 faster**  
Cullinet ran a benchmark of Release 10.2 to test it in comparison with its predecessor, Release 10.0, and found the revised DBMS could execute 104 transactions/sec., compared with the earlier version's 94 transaction/second.  
*Continued on page 30*

## Data View

Unix in the workplace

135 Uniform 1988 attendees say they run the following Unix applications



INFORMATION PROVIDED BY DATQUEST  
CW STAFF

## X/Open support up

DALLAS — The X/Open Consortium gathered more support from both users and vendors recently at the Uniform 1988 trade show held here.

Microsoft Corp. signed on as a member of the consortium's Independent Software Vendors Advisory Council, and Salomon Brothers, Inc. joined the Users Advisory Council.

In addition, both Microsoft and AT&T committed to the X/Open Common Applications Environment for future operating system products.

X/Open's charter is to promote the use of existing and emerging industry standards. Its goal is to achieve an open system environment based on its Common Applications Environment to enable users to move applications across hardware platforms.

*Continued on page 27*

### Inside

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- Dekker moves project management packages up and out. Page 29.
- Brits offers accounting tool for System/36. Page 32.

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3Com® EtherLink*	235
3Com EtherLink+	410
Novell® Ethernet	429

\* Using AST Premium™/286, at 10 MHz, 0 wait-state computer as server.  
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COMPUTERWORLD 2/1989

# IBM programming language ported to VMS

BY NELL MARGOLIS  
CHICAGO

ROCKVILLE, Md. — In a move bound to delight those who prefer letters to words, STSC, Inc. has taken IBM's APL from P.A.D. to VMS.

According to an early user, STSC's Digital Equipment Corp. VMS implementation of APL Plus, the company's enhanced version of the APL programming language, is also likely to receive a warm welcome from DEC VAX-based professionals whose daily work involves massive amounts of complex computation and analysis.

Born in the early 1960s of a mathematician's doctoral thesis and originally com-

fect," Jaffe said. "There are things it can't do." However, he added, "STSC has been exceptionally responsive"; some of the earlier deficits have already been corrected. Moreover, "some of the features are extremely powerful," Jaffe added.

Jaffe said the programming language is suited to his users. "We hire mathematicians and engineers, not computer programmers."

In the early 1970s, "somebody here discovered APL; we found that it was the key to getting a lot of people competent in analyzing their own data," Jaffe said. Armed with APL, "we automated all of our pilot plants — roughly 100 of them,

all doing simulation experiments."

With some 800 scientists running experiments in APL, and with the VAX taking over as hardware platform of choice, Mobil research and development was eager to try the new STSC entry, Jaffe said.

## Splicing it up

STSC's flavor of the generic APL language, called APL Plus, includes such enhancements as a multilevel, component-based file system, built-in error handling, a report formatter and a software utility library, STSC's Wheeler said.

Available across a wide range of mainframe, minicomputer and microcomputer

platforms, APL Plus has run on the VAX under Ultrix for several years. Several months ago, the company introduced APL Plus for VMS.

In addition to standard APL features, such as nested arrays for handling advanced data structures and a full-screen editor and session manager, the VMS version includes two new commands that let the user execute VMS document-control language commands from within an APL environment and an interface between APL and other programming languages that has been enhanced for use with VMS. A maintenance update, due to ship this quarter, will add full VMS file-handling facilities, according to Wheeler.

APL Plus for VMS costs between \$4,000 and \$33,000, depending on CPU.

**WE FOUND [APL]**  
was the key to  
getting a lot of  
people competent in  
analyzing their own data."

STEPHEN JAFFE  
MOBIL RESEARCH &  
DEVELOPMENT CORP.

mercialized by IBM, APL is a parallel programming language that can process an array of numbers in a single operation, according to James Wheeler, director of APL technology at STSC.

"STSC's [APL Plus for VMS] is good; it's very good," said Stephen Jaffe, research consultant at Paulsboro, N.J.-based Mobil Research & Development Corp., a subsidiary of Mobil Corp. and an APL Plus for VMS beta-test site. The research and development needs of Mobil center on the analysis of vast amounts of data, Jaffe said.

The early implementation "isn't per-

## X/Open

CONTINUED FROM PAGE 25

Its efforts have been focused on the establishment of Poix, an emerging Unix standard, and, more recently, The MIT X Window System.

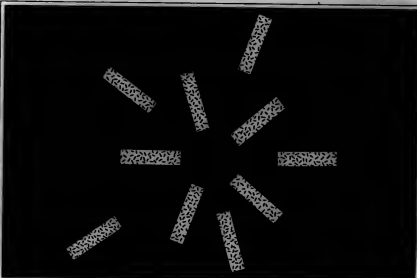
Until recently, X/Open, founded in 1984, has had a low profile in the U.S. Its headquarters are in London, and many of its members are European companies. Over the past several months, however, several U.S. vendors and users have joined the X/Open bandwagon.

### The goals

At Unixworld, X/Open also outlined its specific goals for this year. The group is preparing a revised version of its System Calls & Libraries definition so that it remains consistent with the Poix standard.

It intends to address networking issues for the first time. The initial step will be to define an X/Open Transport Interface, a programming interface to the Level 4 Services of the International Standards Organization's Open Systems Interconnect model.

The group also plans to address the security of the Unix operating system by publishing a handbook on the security features of Unix.



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# Dekker ports software to VAX world

BY NELL MARGOLIS  
CW STAFF

REDLANDS, Calif. — Dekker Ltd. is sending its project management software packages up and out; up from personal computer platforms to VAX/VMS and out of exclusively military contracting into the commercial world.

Dekker Trakker and Dekker Tracker Plus, introduced two years ago to run on IBM Personal Computers and compatibles, were originally targeted at large-project U.S. Department of Defense contractors that needed to comply with

rigorous DOD requirements, according to company founder and President Simon Dekker.

The Digital Equipment Corp. VAX versions of both Dekker packages are expected to ship this quarter. Dekker Trakker lets the user plot all of a project's activities in order of performance, assigning the resources required and costs incurred at each step, Dekker said. Dekker Trakker supports the Critical Path Method (CPM) of scheduling, including both the arrow and the precedence diagramming methods. Users can also create a schedule without using CPM, relying in-

stead on a series of Gantt charts, according to Dekker.

With Dekker Trakker, a user can define an unlimited number of activities and resources and then apply an unlimited number of cost and burden rates against them on a budget, actual cost or estimate-to-complete basis, the company said. The package provides detailed scheduler and resource/cost reports and graphics.

**Features include analysis, reporting** Dekker Trakker Plus includes additional analysis and reporting features, according to Dekker. It allows users to perform

time-phased calculations, including budgeted cost for work scheduled, budgeted and actual cost for work performed, cost and schedule variance and performance, various performance indexes and independent estimate at completion.

Dekker Trakker Plus will produce all documents and graphics associated with performance analysis, prominently including cost performance reports and cost/schedule status reports.

Dekker Trakker VAX license prices range from \$20,000 to \$40,000; Dekker Trakker Plus VAX license prices range from \$35,000 to \$65,000, depending on the number of users. Base prices for both packages include one year of software enhancement service and customer support for one key contact.

## Hamilton

CONTINUED FROM PAGE 25

At Uniforum, IBM went to great lengths to articulate its ideas on Unix. AIX got the nod as the strategic Unix, which means the other IBM Unix versions will be phased out over time. AIX's importance stretched out to the AIX workstation family, now considered very strategic to the efforts of IBM's Entry Systems Division. Finally, although Unix is not part of SAA, it will be consistent with SAA where it can. Bridges will be provided to SAA in areas in which Unix cannot conform.

IBM is to be commended for its efforts at Uniforum, because embracing Unix couldn't have been easy. After all, IBM has long kept its distance from the Unix market.

IBM has in the past indirectly conveyed the message: We know what's best, and Unix isn't it. IBM had to eat that message at Uniforum.

Despite the great strides IBM made at Uniforum, there were indications that it will only go so far in committing to the open systems market that Unix supporters hope to create. And that, ultimately, is not the best way to serve its users.

### Unix: A three-letter word

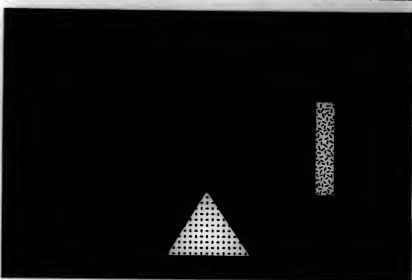
For instance, William Lowe, president of IBM's Entry Systems Division, took the podium at a press conference and announced that "from our perspective, Unix is a three-letter word: A-I-X."

Maybe that was intended to be just a catchy phrase to show support of Unix. But it also can be interpreted with a proprietary ring to it, which is exactly what Unix is not about.

Also, IBM has said no thanks to the X/Open effort. X/Open is a group of vendors working toward creating an open systems environment based on existing and evolving industry standards.

Company executives said it wasn't necessary to belong to the group. When asked about IBM's plans for X/Open, Andrew Heller, a vice-president at the Entry Systems Division and general manager of advanced engineering systems said, "We continue to evaluate it, but as long as they stay on-course, we would rather work directly with the standards groups."

IBM's decision not to become an X/Open team player has an air of snobishness about it, which goes against the open systems philosophy.



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Hamilton is a Computerworld senior writer.

## IDMS/R

CONTINUED FROM PAGE 25

## sec. rate.

The transactions consisted of 60% simple retrieval, 20% updates and 20% complex retrieval. Release 10.2 could process 225 I/Os per second, and Release 10.0 could handle 200 I/Os per second, according to Litwack.

## Improved performance

Both benchmarks were performed on an IBM 3090 Model 200 under MVS/XA. The improvements ranged from 10% to 12.5%.

Release 10.2 also has an improved user interface that produces a less cluttered screen with clearer terminology and more user prompts, according to Litwack.

The release allows IDMS/R data base administrators to create a backup copy of the data base without interrupting updates or other transactions. In addition, data base administrators will be able to implement maintenance tape files while the system is running.

## Round-the-clock functions

In both instances the previous release of IDMS/R would have required a shutdown for the procedures. Release 11.0 will add additional 24-hour operational characteristics to the product, Litwack said.

Most of Release 10.2 runs above the

16M-byte, virtual-memory line under MVS/XA. Only a few parts of the DBMS run above the line in Release 10.0, Litwack said.

In addition, related tools and subsystems, such as IDMS Architect, Collinet's computer-aided software engineering tool kit, and ADS/Online, the firm's fourth-generation applications development system, also run above the line when used with Release 10.2, Litwack explained.

The latest release of IDMS/R is priced between \$104,000 and \$390,000, depending on system configuration, Collinet officials said. The existing base of 2,400 IDMS/R customers will receive Release 10.2 as an upgrade without charge, the vendor said.

## Object-oriented

CONTINUED FROM PAGE 25

at 50 beta-test sites since mid-1986 and is slated to be generally available in April.

One of Servio Logic's beta-test sites is the National Oceanic and Atmospheric Administration (NOAA), which is using Gemstone to store navigational information of the coastal waterways. Objects can be extended more easily than data types; for example, if the NOAA wants to add a list of lighthouses to the class of objects known as "navigation aids," they will find that class alongside buoys, radar sounding points and U.S. Coast Guard stations, said J. Michael Connell, senior product manager at Servio Logic.

"Most of our beta sites are national laboratories or universities. Object-oriented is the successor technology to relational data bases, and it's still quite new," Connell said.

Relational data bases can be used as the underlying system for an object-oriented system, according to Ontologic's Robert R. Martin, vice-president of marketing. But a relational data base is not a prerequisite to object-oriented systems and can limit their performance, he said.

## CAD market targeted

Object-oriented systems are expected to account for only \$10.5 million of the \$1.5 billion DBMS market in 1988, Dataquest's Sutherland said. The primary market for object-oriented systems are users of CAD systems, who try to track numerous versions of text and images and develop new products.

"Without an object-oriented approach, they are in danger of losing control of their ability to manage their files. Their work is much more detailed than the data in business data bases," Sutherland said.

Ontologic's Vbase 1.0 will be able to handle related text, geometry and graphics as objects, Martin said. It is written in C and will support C and SQL. It was designed to run on Sun workstations and VAXs under DEC's VMS. No pricing is available yet on the product.

Servio Logic said Gemstone, announced last week, can manage three elements of data — structure, behavior and value — at the same time. It is available immediately under VMS at a price of \$9,975 for a DEC Microvax II and \$119,700 for a VAX 8800. Licensed for a VAX 8800, the software can handle up to 64 users. Gemstone will be available in the second quarter for Sun-3 and Sun-4 workstations, Connell said.

An object-oriented programming language, Opal, for data definition and manipulation can be purchased as an option with Gemstone. Applications may also be written in C or Smalltalk, an object-oriented language originated 10 years ago at Xerox Corp.'s Palo Alto Research Center. Gemstone also supports Ethernet and RS-232C networks, Connell said.

Servio Logic, a subsidiary of the San Pao Group in San Francisco, was founded in 1982. Gemstone is its first product.

Ontologic was founded in 1983 as Moasic Technologies, Inc. and produced graphic workstations. It changed its name and focus in 1985 to develop an object-oriented system.

Although there are several vendors of object-oriented programming languages, only a handful of object-oriented system producers exist today.

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## NEW PRODUCTS

## Systems software

A logical data modeling software package for use on IBM mainframes under the TSO of IBM's MVS operating system has been announced by Holland Systems Corp.

Called Design4data, the package is used to design stable, shorable data models that serve as templates for data bases. Features include multilevel project control, cross-referencing capabilities, password protection and a directory that provides a control mechanism for naming, storing, editing and reporting on data elements, user views and logical data modeling.

Other features include multitier, on-line and batch operations, graphic model representation, full menu support, on-line help and data-use requirements collection.

The Design4data package is priced at \$45,000.

Holland Systems, Suite 303, 3131 S. State St., Ann Arbor, Mich. 48108. 313-995-9595.

An accounting system designed for use on the IBM System/36 has been announced by Britis Publishing, Inc.

Called the Britis General Ledger, the software includes such features as multicolumn processing, recurring journal entries and financial statements. It can also interface with the vendor's Bpay accounts payable system.

Britis General Ledger is priced at \$199, including RPG-II source code.

Britis Publishing also announced Release 5.1 of its Indoc documentation system for indicator use on the System/36. Enhancements include a feature allowing the user to document indicators that are used in screen formats and improved print format. Indoc costs \$99. Current users can upgrade for \$49.50.

Britis Publishing, 1814 Capital Towers, Jackson, Miss. 39201. 601-354-8882.

An enhanced version of the VMSQL/ Edit full-function table editor for IBM's SQL/DS has been announced by Applied Relational Technology, a division of VM Software, Inc.

Release 1.1 offers data validation capabilities allowing individual fields on the screen to be validated according to a range or list of values or minimum, maximum and default values as well as passing the field to a REXX user exit for further validation or reformatting.

Also included are screen painting enhancements that allow users to create and customize screens using the cursor instead of commands; fill-in-the-blank fill screens for performing selective queries; and the ability to edit specific views.

VMSQL/ Edit costs \$13,500 for a permanent license and \$9,500 for a three-year license.

Applied Relational Technology, 1800 Alexander Bell Drive, Reston, Va. 22091. 703-264-8000.

## Applications packages

J. D. Edwards & Co. has released its Subcontract system for the IBM System/38.

The Subcontract system provides for management of contract commitments associated with construction, maintenance and professional service contracts, according to the vendor.

It features tracking of submittal requirements, transmittal information, purchase orders, progress payments and contract status.

The software is integrated with the vendor's General Accounting and Accounts Payable systems and is part of the Construction Management line.

The system costs \$11,000.

J. D. Edwards, 4949 S. Syracuse St., Denver, Colo. 80237. 303-773-3732.

A 32-bit version of the Escalibur Plus business system has been announced by Armor Systems, Inc. for use on The Santa Cruz Operation, Inc.'s SCO Xenix 386 operating system.

Escalibur Plus is an integrated, multitier accounting system with applications for accounts receivable, accounts payable, inventory control, point of sale, payroll, order entry, billing, general ledger and customer information.

Each Escalibur Plus applications module for the SCO 32-bit Xenix system is priced at \$1,099, except the Customer Information/Data Base Management system, which costs \$600.

Armor Systems, 342 N. Orlando Ave., Maitland, Fla. 32751. 305-429-0753.

Boston Business Computing, Inc. has upgraded two of its Digital Equipment Corp. emulation products for Microsoft Corp. MS-DOS and Unix systems.

Version 3.0 of the VCL DEC VMS emulator adds 30 commands, lexical functions, flow control of command files, an updated manual and a customizable Help facility. It implements DEC's DCL command language.

EDT+ is an enhanced version of the PC/EDIT emulation of DEC's text editor, VAX EDT. It features increased speed, an updated manual and file-transfer capabilities.

Licenses for VCL 3.0 start at \$195. Licenses for EDT+ start at \$295.

Boston Business Computing, Riverwalk Center, 360 Merrimack St., Lawrence, Mass. 01843. 617-683-7920.

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# MICROCOMPUTING

## MICROBITS

Douglas Barney

### Informix wins OS/2 derby



The very first Informix Software has beaten rivals Oracle and Relational Technology in the race to ship OS/2 versions of relational database management system software and tools. The Informix products would have hit the market even sooner if IBM had been a bit more efficient in shipping its final version of the operating system.

It's a natural. When Microsoft announced an equity position in Natural Language, Inc., provider of a natural language interface for SQL-based data base management systems, Microsoft's SQL data base was just a juicy rumor. Now that Microsoft has an SQL back end, it makes sense to use the Natural Language product as a front end. So while Ashton-Tate sells the dBase language as a front end, Microsoft sells English.

At the time of the investment, Microsoft President Jon Shirley said Natural Language products would not be incorporated into Microsoft products for some three years. But since the only barriers to moving the Unix-based Natural Language

Continued on page 42

## OS/2 seen as boon for Paradox

Author claims 20% to 200% performance leap in mid-'88 version

BY JEAN S. BOZMAN  
CITIZEN

CHICAGO—One of the authors of the Paradox microcomputer-based data base management system said he believes his software will run 20% to 200% faster in the OS/2 versions that Borland International plans to ship during the second quarter.

But performance is not the whole story. "The real benefit of running Paradox under OS/2 is that it will have the ability to do context switching and real multitasking," Richard Schwartz, vice-president of software development at Borland, recently told the Chicago Association of Microcomputer Professionals.

For now, Borland is demonstrating a version of Paradox that runs under character-based OS/2, the operating system jointly developed by IBM and Microsoft Corp. In that version, Paradox's 384K-byte program runs under the 640K-byte limit of DOS 3.0.

Until IBM ships its OS/2 Presentation Manager in late 1988, Borland will continue to sell the same user interface available on the current version of Paradox.

**Programs run side-by-side**  
"We're chosen to be fairly limited in how we present multitasking to the user," Schwartz told the Chicago users group. "Paradox is running as a single applica-

tion, not as a multithreaded application. OS/2's multitasking capabilities are then used to allow multiple Paradox applications to run side-by-side."

When IBM releases the Presentation Manager, set for late this year, Borland will develop a new user interface for Paradox, making full use of multiple windows, pull-down screens and selection through mouse clicking.

"You can then present the user with a more intuitive interface," Schwartz said. "The Presentation Manager will allow users to point to something and to use it by double-clicking on a mouse."

A planned user-transparent link to SQL will allow Paradox

queries to be directed toward mainframe IBM DB2 DBMSs, Schwartz said. This SQL interface could, he said, then be used to link Paradox to other popular DBMSs, including Oracle Corp.'s Oracle running on Unix machines.

Borland is also evaluating whether it will support Unix and Apple Computer, Inc. Macintosh versions of Paradox, Schwartz said. Former Apple Software President Ron Power had earlier promised a Unix version of Paradox.

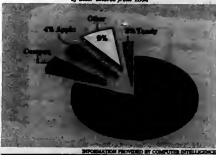
#### Inside

- VP Ingers talks about the Lotus challenge. Page 41.
- Odesta data base to handle RMS files. Page 42.
- Callper Maintenance Software designs hospital system. Page 50.

## Data View

Inside track

IBM System/34, 36 and 38 users buy 80% of their micros from IBM



## PS/2, RISC melded for academic workstation

BY ED SCANNELL  
CITIZEN

RYE BROOK, N.Y.—Marking the first marriage of its Personal System/2 and reduced instruction set computing technologies, IBM recently introduced a workstation for the academic market. Rumors of such a system have been circulating in recent months.

Called the 6152 Academic System, the product uses the PS/2 Model 60's box in combination with a new chip similar to

the one used in IBM's RT Personal Computer.

IBM also unveiled a software system it co-developed with Carnegie-Mellon University to manage a university's distributed computing environment using a 6152. The Andrew System consists of the Andrew Tool Kit and the Andrew File System.

The 6152 is available in several configurations, ranging from a low-end system that can handle between 2M and 20M bytes of disk storage up to a version

Continued on page 46

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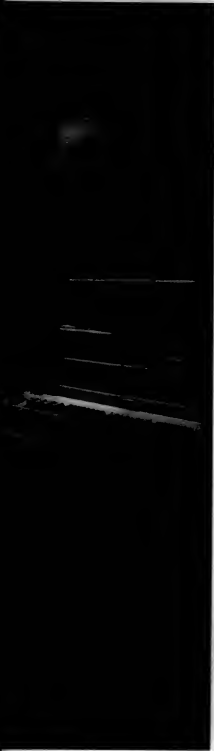
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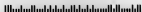
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SMALL  
TALK

William Zachmann

NEC rewrites  
the script

A couple of weeks ago, I spent several days in bed with bronchitis and a fairly high fever.

With my temperature running over 103 degrees, I had lots of strange dreams, and quite a number of them had to do with fractals, Mandelbrot sets and Postscript.

What got my overheated brain going on the first two subjects was an exciting book titled *Chaos: Making of a New Science*, by James Gleick. It is a survey of some of the most exciting new research and theoretical thinking in the physical sciences.

But what put Postscript into my neural circuits was an equally exciting personal computer printer: the NEC LC-890 Si-text writer. It has made me, overnight, a born-again convert to Postscript, despite its hefty \$4,395 list price and equally hefty 66-II bulk.

Postscript, the page description language developed by Adobe Systems, Inc., is a means for describing the marks that you want to make on paper, which can include complex graphics and elaborate text fonts.

A Postscript printer is really a printing computer. The LC-890, for example, contains a Motorola 68000 and 3M bytes of memory. It is, in effect, a powerful print server that accepts the Postscript input stream from the host and turns it into impressive marks on paper.

The LC-890, however, can attach to any IBM Personal Computer or compatible by means of either a standard Centronics printer cable or an RS-

Continued on page 43

Lotus marketeer talks of 1-2-3, standards  
and sharing the world with Microsoft

As vice-president of corporate marketing and business development for Lotus Development Corp., Frank Igarai has a simple job: make more money from existing products and make new products such as Lotus/DIMS successful. Difficult as it sounds, the hardworking creative writing buff and sometime-musician seems up to the task.

Igarai spoke with *Computerworld* Senior Editor Douglas Barney about the challenges ahead and some of the ways in which Lotus will approach its changing market.

**How will Lotus's 1-2-3/AM for IBM 370 hosts work?**  
We have been able to use the core code on the PC and the mainframe, which allows for 100% compatibility. And 1-2-3

on the PC can engage with the mainframe in a couple of different ways. You can run your spreadsheet on the PC as a stand-alone application and have file exchange with the mainframe. Or you can go into terminal-emulation mode and run the spreadsheet on the mainframe.

**Will one approach be used by organizations more than the other?**  
It is not an either/or proposition. You will see a lot of both.

**How do you view Microsoft Corp. as a competitor?**  
It is the relationship made more difficult because that firm controls the operating system and



Igarai poised to meet the challenge of changing market

**also acts as a competitor?**  
It is a very interesting relationship, which kind of characterizes this industry. It is a fiercely competitive business, and yet it is a lot of people having a good time. It is very interesting to have the

role that they have in the systems business and the applications business, and they are quite cleverly going to try to parody that.

**Is that fair?**  
By the rules of today's game, that is fair competition.

**But how can you maintain a good relationship when Microsoft is coming after you in every market you target?**

They play pretty straight. I could not run Microsoft down on this subject. We do think we hold the trump card in the applications market.

**What is your approach to the data base management market?**  
Continued on page 43

Dell finds favor as the 386-based  
machine of the cost-conscious setBY JULIE PITTA  
CHICAGO

AUSTIN, Texas — Although it lacks the glamour of 80386 machines from Compaq Computer Corp. or IBM, Dell's 386-based personal computer is gaining influence with business users.

The Dell 386/16, a 16-MHz machine based on Intel Corp.'s 80386 chip, is especially popular with users with small budgets.

"Why didn't we go with a Compaq?" We're talking about saving money," said Bill Pierce, director of end-user computing for Gold Kist, Inc., an agricultural cooperative that ranks among the Fortune 500. "The price is right."

Introduced last June, the system offers 1M byte of random access memory, 128K bytes of



read-only memory and a 1.2M-byte flexible disk drive. A configuration with an additional 40M-byte hard drive and a 12-in. monochrome monitor is priced at \$4,599.

Last week, Dell upgraded its 386 machine, renaming it PC's Limited System 300. The new version adds IBM Video Graphics Array support and the option of a 314-in. flexible disk drive.

A configuration of the PC's Limited System 300 with a 40M-byte hard disk drive and a 12-in. monochrome monitor is

priced at \$4,599.

Price is not the only reason for the machine's appeal, said Bill Lempien, a PC industry analyst at Dataquest, Inc. Dell suggests its mail-order approach with a direct sales force targeted at corporate accounts.

The Dell 386/16 also offers corporate customers 12 months of on-site service through third-party Honeywell Bull, Inc.

"Its performance is up there with most everyone else's," Lempien said. "I don't know if there's really any downside to buying it, except that Dell is not as big as a Compaq. But they are more aggressive in terms of price."

Lempien said Dell sells a large chunk of its PCs to corporations. According to sources, sales to business customers accounted for about 30% of Dell's

revenue last year. In 1987, Dell had earnings of \$6 million on revenue of \$110 million, making it the seventh largest U.S. micro-computer manufacturer.

Gold Kist has purchased seven Dell 386/16s for use as stand-alone systems to perform tasks such as inventory management of the co-op's poultry feed mills and general accounting.

Pierce said he expects to acquire more Dell 386/16s throughout the year. Some will be used as file servers in local-area networks.

So far, Pierce said, he is pleased with the Dell system's performance. "All the boards that we typically like to use with our PCs are working fine," he said, adding that Dell has been able to deliver the machines to Gold Kist within a week.

The Dell 386/16 represents the first significant close purchase for what until now has been a solidly IBM shop. Gold Kist has 400 IBM Personal Computer ATs and PC XTs. Pierce said Gold Kist has standardized

Continued on page 43

## Mac earns its stripes at Chevron

Open architecture greases skids for former pariah at oil giant

BY JULIE PITTA  
CHICAGO

It was once an unwelcome sight. But now, Apple Computer, Inc.'s Macintosh plays an integral role in helping Chevron U.S.A., Inc. handle data on the more than 2,000 barrels of oil processed each day at its Richmond, Calif., refinery.

Until recently, according to W. J. Silva, lead analyst for the

refinery's computer operations, Macintoshes were meeked into Chevron departments under the guise of special-purpose requirements.

"People were bringing them in, telling corporate [management] they had special needs for graphics or for desktop publishing and using them for everything," Silva said.

At Chevron last fall, however, the Macintosh was promoted to

Level 1, a designation that indicates the system is fully supported by Chevron's corporate guidelines.

"It's being used by everyone — a real cross section of the refinery," Silva said, noting that 500 users have access to the approximately 90 Macintoshes. "It's now the machine of choice."

Silva said Chevron's switch

Continued on page 46

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## Barney

CONTINUED FROM PAGE 37

product to OS/2 are the porting of code and finding a machine powerful enough to run it, will it really take three years?

The new Ashton-Tate? Ashton-Tate has taken a lot of heat for technological lethargy and an overemphasis on marketing. Now, Tate insiders are beginning to speak of an Ashton-Tate renaissance spearheaded by Dbase IV, which was written entirely by company developers (most of the firm's products were acquired or licensed from others).

And they just might be right. Ashton-Tate went out of its way to pick up some data base hotshots to pull Dbase IV together, and early reports indicate that Dbase IV is as innovative as it gets. But the important thing is that the company has a new attitude.

The firm is highly confident in its technology but is taking great pains not to appear arrogant. If the company truly has the technical momentum that some describe, the real winners are the more than 1.5 million Dbase users.

Microsoft does it backwards. Microsoft officials once held that writing applications for the OS/2 kernel was "doing it backwards." Instead, they said, the way to go was to write for their own Windows, then port those babies up to the Presentation Manager. Microsoft still plans to support Windows and the Presentation Manager but will try it backwards first—with OS/2 kernel versions of Word and Multiplan.

## Odesta piece fits data base puzzle

An already innovative data base product that uses an Apple Computer, Inc. Macintosh as a front end and a Digital Equipment Corp. VAX as a back end will be enhanced later this year to access VAX RMS files.

Odesta Corp.'s Helix-VMX uses the Macintosh's graphical interface for querying and applications development. However, some 80% of the files found on VAXs are currently excluded from this scheme.

"The piece of the puzzle that has been left out was that most data on VAXs is sitting in RMS files. It is murder to get that information out of there," said Daniel Chisfetz, president of Odesta.

RMS files will also be accessible via terminal emulation while maintaining some of the icon-driven Mac interface.

With Helix-VMX, users can develop applications using a visual, object-oriented approach, the vendor said. The system provides on-line transaction processing capabilities, record locking and customizable menus.

The product is, in part, an outgrowth of a cooperative development partnership reached last year between Odesta and DEC. Under the agreement, DEC provides Odesta with machines for development and testing as well as technical guidance.

The new version of Helix-VMX was announced last week and should be available later this year.

OS/3, where are these? Microsoft Chairman Bill Gates once estimated that an Intel 80386 version of OS/2 would ship about 12 months after the original and that applications should move smoothly from one OS/2 to another. That would have meant that OS/3, let's call it, would ship before the end of this year. Given that the Presentation Manager won't ship until late this year, users could have waited just a couple of months and jumped to the 386.

Now we hear that OS/2 for the 386 won't ship until, maybe, mid-1989, which means you might have to give the Intel 286 version a try anyway.

**Windows dressing.** In its rush to publicize Windows, Microsoft has also pulled

in a couple of unreleased applications. A two-page advertisement about OS/2 Windows applications and includes an unfinished Windows version of Paradox, which Borland International seems to have stopped talking about, and Beacon, a language product that is being developed by Micro Database Systems. Too bad Microsoft didn't toss in some screen shots of some of its unannounced Windows products.

**All downhill, Ray?** If you don't catch Raymond L. Ocampo Jr. when he isn't representing Oracle, you may miss him completely. Outside the courtroom, he is often just a blur. Ocampo, who is in charge of litigation for the distributed data base dynamo, was the only repre-

sentative of the Philippines at the Calgary Winter Olympics in the luge event. While Ocampo didn't win the gold, he did win the award for highest placed Filipino software lawyer.

**Our memory works.** Reports that some third-party memory boards do not support OS/2 have made some buyers wary. Ideas Associates sees this as a major opportunity and is claiming that its Ideasmax/MC and Idea Supermax/MC, which both work with the IBM Personal System/2 line, support OS/2. Will we now get releases from firms whose boards crash under OS/2?

Barney is a *Computerworld* senior editor, micro-computing.

# What our financial services clients will tell you about N.E.T. T1 networks:



## Zachmann

CONTINUED FROM PAGE 41

232 (25-pin) or RS-422 (nine-pin) serial connector.

The LC-890 can also attach to an Apple Appletalk connector as the Apple Laserwriter does.

Using a full-function word processing program like Microsoft Word with the LC-890 opens a whole new world of output possibilities. With a full-blown desktop publishing package like Aldus Pagemaker, the LC-890 makes any IBM PC or compatible as capable of sophisticated desktop publishing as any Apple Macintosh.

The LC-890 provides 35 built-in and

scalable font sets for operation in both interactive and batch Postscript modes. It also offers 13 fonts in Dublin 630 and Herston-Pickard Laserjet emulation modes. Fonts, emulation modes, a choice of two separate high-capacity feed trays and other options are set with front-panel controls.

I suppose that Macintosh and Laserwriter users, long accustomed to the benefits a Postscript printer brings, will smile tolerantly at the excellent fudgy-duddy IBM users like me feel as we finally see the light. No matter. The LC-890 has made a Postscript believer out of me, probably for life.

Zachmann is vice-president of research at International Data Corp.

## Lotus marketeer

CONTINUED FROM PAGE 41

### market system market?

We have strength that comes from the sheer knowledge of how people interact with PCs, especially doing numerically related analyses and decision support. We also bring the spreadsheet and the graphics to this market. We see a very tightly clustered set of fundamental productivity tools — the spreadsheet, the data base and the graphics [Freemarc] — that is used to pull information out. We have been working on this DBMS for several years and have a great set of tools. It will be very easy for people sitting at PCs to work with SQL engines.

Will your tools be available for other SQL engines?

Absolutely. We said we would eventually support IBM's DB2 with the tools. We will be as aggressive as we can for all the major engines. We will also be willing to link up to what might appear to be competitive engines.

Lotus's 1-2-3 has sold well, in large part, because of its familiar interface. Wouldn't a Presentation Manager version with a new interface put you back at square one?

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How will you handle the upgrade to 1-2-3 Release 3, which may well be the largest upgrade in microcomputer software history? We have a lot of people testing 1-2-3 Release 3 to make sure it is completely compatible. We are also engaging the channel in the upgrade. Last time, most upgrades were direct.

## Dell finds favor

CONTINUED FROM PAGE 41

on the AT bus and that for now, he does not expect to migrate to the Micro Channel-based Personal System/2s.

"We feel we made a fairly conservative decision to go with Dell," Pierce said. "I am a little nervous about it; we've been going with Big Blue for a long time."

Dick Cooper, the engineering design coordinator for 3M Co.'s Dynalyst Systems Division, is looking to Dell as a cost saver. "We're looking for performance for the dollar," Cooper explained. "If the PC's Limited machine can deliver the same performance as a Compaq, we'll buy them because they are cheaper."

So far, the Dell 386/16 is meeting expectations, Cooper said. 3M is using the Dell 386/16 as a server in a LAN in which users are performing computer-aided design applications.

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## Mac earns stripes

CONTINUED FROM PAGE 41

from the once preferred DOS world to the Mac resulted from Apple's elimination of some elements on the machine to which Chevron had objected. For one thing, with the introduction of its open-architecture Macintosh SE and the Macintosh II last spring, Apple systems can now be upgraded. In addition, connecting Macintoshes to minicomputers and mainframes, as well as to other Macintoshes, is simpler because of new communications products from Apple and third-party vendors.

Chevron's blessing of the Mac generated a flood of purchases. At the end of last year, the refinery counted about 40

Macintoshes. Today, that number has more than doubled, and Chevron is buying the micros at a rate of six to eight per month. Silva says he expects Macintosh installations to top off at about 150.

The Motorola, Inc. 68000-based Macintosh SE makes up the majority of the new PCs the refinery buys. Chevron orders the more powerful Motorola 68020-based Mac IIs for special purposes, especially for use as word processors to replace obsolete Xerox Corp. 860s. The Mac II's larger screen makes it ideal for word processing, Silva said. Additionally, the refinery purchases Mac IIs for compute-intensive applications. "As some of the engineering groups start crunching more data, they will need the more powerful CPU," he explained.

As a result of the increased interest in the Macintosh, Chevron picks up only one or two Microsoft Corp. MS-DOS-based PCs a month, Silva said. Currently, the split between Macintoshes and MS-DOS-based PCs is about even, but the number of Mac installations will likely overtake that of DOS-based PCs in the next month.

Still, Chevron has not completely given up DOS-based machines for Macintoshes. "There's always a die-hard user who has spent months learning Lotus's 1-2-3 and won't switch over to [Microsoft's] Excel," Silva said.

But "a lot of people with DOS-based machines are replacing them with Macintoshes," he continued. "The Mac is user-friendly; it's easily learned by the novice and easily remembered by the casual

user. Once you've learned one Mac program, you know all the Mac programs."

Chevron is sending replacing DOS-based PCs to its maintenance department for use in a maintenance shutdown tracking system, a software program written exclusively for a DOS-based system.

### Mac of all trades

The refinery uses Macintoshes for a variety of tasks — from simple word processing by clerical personnel to data analysis by refinery engineers. In fact, Chevron organized the Macintoshes into small work groups all connected via Apple's AppleLink network.

Macintoshes can access data stored in the refinery's Digital Equipment Corp. POP-11/84 minicomputers through modems hard-wired to access ports in the DEC mini. Macterminal, a communications program resident in the Macintosh, dumps data onto the Mac's screen.

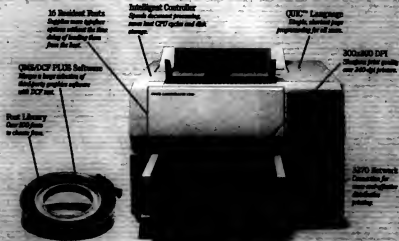
Connection to the DEC mini allows the Mac user to access data relating to the refinery process. Oil products created at the refinery vary from aviation fuel, gasoline, diesel fuel, waxes, asphalt and lubricants, Silva said. Crude oil is brought to the refinery, where it is heated, broken down into its different components and then re-refined. "The finished process for one product is the feed for another," Silva said.

The mini store operating histories — records of temperature, flow rates and pressure in the storage vessels. "We're constantly monitoring," Silva said. "Engineers use the data to analyze the parts of the process that they are responsible for. They look for problems and how to correct them."

All the data sent to the Macintosh can be organized into graphs through the use of packages like Cricket Software's Cricket Graph. "By graphing the data, you can see problems that you couldn't by just looking at raw numbers," he said.

Desktop publishing tools allow refinery engineers to create reports using the graphed data. In addition, Chevron uses Mac-based desktop publishing systems to create operator manuals as well as the refinery's in-house newsletter.

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## PS/2, RISC

CONTINUED FROM PAGE 37

sion that can store between 8M and 140M bytes. Depending on the configuration, prices range from \$7,000 to \$11,000, including monitors.

Users can run IBM's PC-DOS and OS/2 Standard Edition 1.0. The system also runs the Academic Operating System 4.3, a Unix-based, multitasking system that will be available only to universities, on the mainframe.

The Andrew Tool Kit contains several programs that can be used for software development and graphics display. The Andrew File System supports file sharing and decreases network tie-ups by directing user access to programs and data on local disk storage instead of over a network, a spokeswoman explained.

The system will be sold in the U.S. to colleges and universities only. IBM declined to say whether it would make such a machine available commercially.

The 6152 is expected to be generally available by July. The Academic Operating System 4.3 for the R7 PC should be available this month for \$1,715 and a version for the 6152 next month for \$300.



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## NEW PRODUCTS

## Systems

Two Intel Corp. 80386-based microcomputers have been announced by Advanced Logic Research, Inc.

Called the Fleascape 16386 and the Fleascape 20386, both systems are based on the Intel 62386 coprocessor. The 16386 operates at 16 MHz with no wait states, and the 20386 operates at 20 MHz with no wait states. Both feature a flexible bus design and cache memory.

Other features include 1M byte of 32-bit dynamic random-access memory expandable to 2M bytes on the main system

board and a hard-disk controller.

The Fleascape 16386 costs from \$4,690. The Fleascape 20386 costs from \$7,490.

Advanced Logic, 10 Chrysler Ave., Irvine, Calif. 92718. 714-581-6770.

## Software applications packages

Expert system development software said to generate C source code from decision trees has been announced by Programs in Motion, Inc.

The package, called 1st Class Fusion Expert System, also offers code

generators for Pascal and production rules. Features are said to include the ability to see the current knowledge base in context with others in an expert system and to move from one knowledge base to another with just a keystroke.

The expert system software can capture and display text or graphic screens from other applications for display and can link directly to Ashton-Tate Corp.'s Dbase III.

1st Class Fusion Expert System costs \$1,295.

Programs in Motion, 10 Sycamore Road, Weyland, Mass. 01778. 617-653-5093.

Info-XL, an information management program for IBM Personal Computers

and compatibles, has been announced by Valer Software Corp.

According to the vendor, Info-XL allows users to view a single large information base through various on-screen windows, each of which tracks different types of data. Users can set up permanent or temporary links between information categories by using a built-in outline or an ad hoc approach using the search capabilities.

Features include a window for building structured data files; a window for entering and maintaining free-form text; a daily schedule window; a monthly calendar window; a report generator; and the ability to resize and change color configurations of the windows. Info-XL costs \$150.

Valer Software, 1700 Don Ave., San Jose, Calif. 95124. 408-978-3044.

A software package designed to help hospitals track and manage equipment and facilities has been announced by Caliper Maintenance Software Systems, a division of Diagonal Data Corp.

Medmain automatically schedules maintenance tasks, prints work orders, controls maintenance work load and man-hour requirements, identifies problem equipment, recommends corrective action and details maintenance costs for each piece of equipment, including labor and material.

Intended for hospitals and health care facilities with more than 100 beds, Medmain runs on IBM Personal Computers and compatibles. Prices start at \$3,495.

Caliper Maintenance Software, P.O. Box 2278, Lakeland, Fla. 33806. 813-666-2330.

American Medical Software has announced its Medical Office Billing System and has enhanced its Medical Office Management System.

The Medical Office Billing System is said to process accounts receivable, billing, insurance, claims generation and tracking, patient and medical record inquiries, referral analyses, statements and superbills.

The Medical Office Management System includes the features of the billing system and adds the ability to process appointments, practice analysis reports and recall notices.

The systems run on IBM Personal Computers and compatibles. The Medical Office Billing System costs \$1,995. The Medical Office Management System costs \$3,495.

American Medical Software, P.O. Box 236, Edwardsville, Ill. 62025. 618-692-1300.

Project Software & Development, Inc. has launched an add-on graphics product for its Qwiknet Professional project management software for IBM Personal Computers and Personal System/2s.

The Qwiknet Graphics add-on is said to allow users to produce histograms, network diagrams and bar charts. The graphs can be customized through scaling, coloring and naming options and can be exported to free-form graphics software programs.

Qwiknet Graphics supports up to 256 colors and sizes up to 27 sq ft.

Qwiknet Graphics costs \$645. Qwiknet Professional costs \$1,495.

Project Software & Development, 20 University Road, Cambridge, Mass. 02138. 617-661-1444.

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# NETWORKING

## DATA STREAM

Stanley Gibson

### DEC counters IBM's SAA



DEC's Network Applications Support (NAS), a strategy for linking non-DEC desktop devices to Decnet, has befuddled and frustrated many observers. The last thing the industry needs is another acronym (particularly since National Advanced Systems already lays claim to NAS) or another communications "solution" that includes no products.

The only thing new in DEC's January announcement was its proposed plan to develop OS/2 interfaces to Decnet at a later date. The scarcity of the tangible prompted one way to remark that the Maynard minicomputer marvel might be changing its slogan from "Digital has it now" to "Digital will have it soon."

But in spite of its stumbling debut, NAS, when implemented, promises to be a powerful networking plan and an attractive alternative to IBM's Systems Application Architecture (SAA).

Peering through the clouds of smoke, there can be little doubt that NAS is a response to SAA. DEC didn't want to put it just that way, though. In fact, DEC Chief Executive Officer Ken Olsen specifically denied that NAS was conceived as an SAA alternative.

However, a prepared statement given to consultants—

*Continued on page 60*

## Kodak picks network standards

OSI cornerstone of firm's plan to cut communications costs by 50%

BY KATHY CHIN LEONG  
CW STAFF

ROCHESTER, N.Y. — Tired of managing its computer operations and communications networks without a long-term strategy, Eastman Kodak Co. has embarked on an ambitious global networking plan based on support for the International Standards Organization's Open Systems Interconnect (OSI) architecture.

The project seeks to stabilize the communications platform within Kodak by 1995 in order to drive communications costs down to less than 1% of the sales revenue, compared with the 1.5% currently being spent, stressed Henry Pfendt, director

of the Computer and Telecom Services division. That amount is substantial, since Kodak has reported sales of \$13.3 billion.

Beyond cost savings, both Pfendt and Alan Chase, group manager of research and network engineering, said the move to follow international standards will place Kodak in an enviable competitive position by 1995. Users won't have to worry about what kind of network they are using, Chase said.

**Opening up**  
Kodak represents a growing number of vendors making commitments to open architectures in place of proprietary methods, according to consultant David Ferris, president of Ferris Net-

work Integration. Using standards provides the freedom to plug in new technologies without hurting existing investments, he said.

The goal is to have Kodak networks integrated so smoothly that users anywhere in the world will be able to communicate with each other. Today, it is common to find several terminals and personal computers on a user's desk, each dedicated to a single host. Chase said he expects that these technologies will be merged to provide easier access.

The grand networking strategy was crafted last November with the help of Electronic Data Systems Corp. (EDS) after Ko-

*Continued on page 61*

## PS/2 with AIX goes on-LAN

BY ELISABETH HORWITT  
CW STAFF

DALLAS — IBM has significantly enhanced the communications capabilities of its AIX workstation platform, providing its Personal System/2s with many of the features already offered on its RT Personal Computer.

Several products that were announced by IBM at the Uniform 1988 conference held here recently are part of the vendor's strategy to provide the PS/2 Model 80 as an entry-level system for AIX applications from which users can migrate up to the RT PC, analysts said. An IBM 370 version of the Unix-based operating system is expected eventually.

IBM's Uniform introductions included the following:

- IBM AIX PS/2 Transmission Control Protocol/Internet Protocol (TCP/IP), which allows AIX PS/2 systems to communicate with other computers that support the communications protocol. The price is \$300. The IBM RT PC already supports TCP/IP.

- The IBM AIX PS/2 Workstation Host Interface Program (WHIP) Version 1.0, which allows a PS/2 Model 80 running AIX to exchange files with a 370 or access the host as a Dis-

*Continued on page 55*

## LAN DIAGNOSTICS

### Pinpointing trouble spots

BY RICK DALRYMPLE  
SPECIAL TO CW

Local-area networks have become a vital part of corporate computing. According to one recent Forrester Research, Inc. study of 40 Fortune 1,000 firms, network management is the top concern among MIS directors surveyed.

Not surprisingly, managing a LAN can be daunting: Topologies are complex, a wide variety of protocols are used, and LANs are connected to wide-area networks and corporate hosts via bridges and gateways.

What LAN managers need, then, are diagnostic tools. A variety of such hardware and software products have entered the market during the last 18 months (see story page 56).

*Continued on page 56*



ALAN YALOWITZ

#### Inside

- Net managers form independent T1 group. Page 55.
- White Pine enhances Micro-VAX communications software. Page 62.

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And it won't resemble a happy ending.

## The Jury-Rigged Network And How To Avoid It.

In simple terms, a Jury-Rigged Network is one that was never designed or implemented within a total systems perspective. The individual components, too often a mix-and-match assortment, are forced to perform at degraded levels to achieve ad hoc compatibility. In effect, the whole network becomes less than the sum of its parts, with the end user left to discover—as he certainly will—the weak links built into his network by a vendor who never really held more than a few pieces to the puzzle. A vendor who may not be around when the puzzle comes apart.

Therefore, the key to managing risk in the development of your network lies with selecting the right vendor. A vendor more interested in developing a long-term strategy for your success than selling his off-the-shelf products. Choose wisely and you're no longer talking about a vendor. Instead, you've got a partner.

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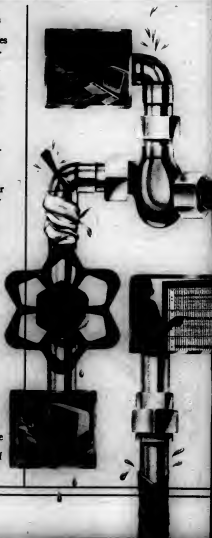
we've been able to develop truly superior products, and build in network integrity from the smallest system to the largest.

We've also been able to deliver end user benefits no other company can offer: backward and forward compatibility in all our network equipment; products that achieve an MTBF 50–200% higher than our leading competitors; and a third generation network management system that's more reliable and easier to maintain and upgrade.

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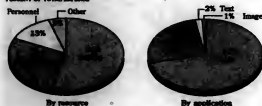
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## Where telecom budgets went in 1987

Average budget breakdown for both manufacturing and service sectors

PERCENT OF TOTAL EXPENSE

INFORMATION PROVIDED BY THE DIEBOLD GROUP, INC.  
CW GROUP

## Service firms' telecom spending up slightly; MIS control loosens

BY ALAN ALPER  
CW STAFF

**NEW YORK** — Telecommunications expenses are estimated to have increased slightly at large North American service companies and decreased marginally at industrial firms last year, according to a recent study conducted by The Diebold Group, Inc.

The survey also revealed that the trend toward MIS control of telecommunications has leveled off. Approx-

mately 69% of telecommunications chiefs at industrial companies report to MIS, compared with 61% of their service company brethren.

"Many MIS people see telecommunications as an expense area, not as a strategic area, but more of a grungy day-to-day thing," said Chester Frankfeldt, a senior associate within Diebold's Research Program. "They see it as a utility; no matter what, they can't control people's urge to pick up the phone."

In its annual survey of information technology budgets, The Diebold Group polled 1,800 major corporations on their telecommunications expenditures and usage patterns. The study reflects responses from 149 firms, or 8.3% of the companies polled, and compares 1987 expectations with 1986 actuals.

As a percentage of revenue, telecommunications expenses at service companies rose 8%, to represent 0.88% of revenue, but decreased slightly to 0.54% of

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KMW protocol converters allow local or remote connection of virtually any asynchronous device to any system using IBM protocols.

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KMW batch protocol converters allow high speed (up to 56 Kbps), high volume batch processing without operator interaction. 3770, HASP, and 2780/3780 emulation allows connection to a variety of printers, plotters, minis, micros, and KMW graphic element processors. Features include auto sign-on, menu-driven setup, on-board diagnostics, and V.35 or RS-232 host interfaces.

### Coax protocol converters.

Without any host modification, our one-port, receive-only unit provides 3287 emulation for connection to low-

cost ASCII printers, plotters and other devices. And adding a KMW VP-10 graphics processor lets your mainframe drive raster output devices.

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3274 SNA and 3271 BSC cluster controller emulation allows up to eight CRTs, computers, and printers remote access to your mainframe. For maximum productivity, printer pass-through allows you to send one set of data to your printer while you work on a different set of data on your terminal or micro. Other features include 25th status line, color, graphics support and APL.

### Twimax protocol converters.

KMW also manufactures protocol converters for use with IBM System 34/36/38 computers. KMW's Twimax converter lets you make the most of your System/3X, by allowing communication with ASCII printers, CRTs, PCs, and Macintoshes.

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**M**ANY MIS people see telecommunications as an expense area, not as a strategic area, but more of a grungy day-to-day thing."

CHESTER FRANKFELDT  
THE DIEBOLD GROUP, INC.

revenue at industrial firms. Service companies are more information-dependent and spend 63% more on telecommunications than industrial companies, Frankfeldt explained.

This gap, however, has narrowed during the last few years, despite the marginal spending decrease at industrial firms. "Service companies spend a lot of money in the early days after divestiture and got ahead of company needs," he said.

Both service and industrial firms spent almost twice as much on service as they did on equipment. The ratios have remained almost constant during the last few years, The Diebold Group said.

Not surprisingly, all companies spent more than twice the amount on voice than they did on data communications. Most are still spending very little on text and image transmission, the survey revealed.

Service companies spent almost three times more on data processing than on telecommunications. Industrial firms spent more than twice as much on data processing than on telecommunications.

"This reflects the attitude that the computer is the factor and telecommunications is the means to get the information out," Frankfeldt said.

Service companies also employ more people to oversee telecommunications than their industrial counterparts, the survey pointed out. Service companies have two telecommunications employees per million dollars spent to industrial companies' 1.49 employees.

"The number for service companies means either most of them have very sophisticated organizations or they're top-heavy," Frankfeldt said.



# Net managers form independent T1 group

BY MITCH BETTS  
CW STAFF

ARLINGTON, Va. — A group of T1 network managers have formed the Independent T1 Users Association to give users more clout when dealing with carriers, equipment vendors, standards groups and regulatory agencies.

The association, expected to be fully functional by September, will fill a gap between the general-interest International Communications Association and vendor-specific users groups, according to Raymond A. Beavan. Beavan is manager of network services at LTV Steel Co., located

in Cleveland.

"We'll be presenting a national united front to the T1 industry," said Beavan, one of six members of the steering committee.

## Connections not made

A major concern of the founding managers is that local exchange carriers, which have 65% of the T1 circuit market, have not established standard connections between the public network and T1 networks.

"Each Bell operating company goes in its own direction by requiring different connectors . . . but users want national

uniformity," said Jerome G. Lucas, president of Telestrategies, Inc., a McLean, Va.-based consulting firm that is working with the association. T1 users are hoping that, collectively, they can prod the industry into solving such problems at a faster pace, he said.

Among the association's goals are to share ideas on acquiring, implementing and managing T1 networks among members; to work with vendors to solve problems; to send representatives to standards groups; and to hire an attorney for representation at the Federal Communications Commission and state commissions, the organizers said.

Full voting membership will be limited to T1 users, but vendors and consultants may be invited to certain meetings as associate members.

## At the wheel

The association's steering committee includes representatives from American Airlines, American Savings & Loan Association and Conoco, Inc.

Telestrategies is providing administrative support for the fledgling association.

Other members of the steering committee are Richard Knapp, product engineer at American Airlines; Thomas Molate, director of telecommunications at American Savings & Loan; and Richard Tuss, assistant director of telecommunications at Conoco.

# PS/2 with AIX

CONTINUED FROM PAGE 51

tributed Functional Terminal (DFT) supporting up to five concurrent sessions, IBM said.

A PS/2 equipped with WHIP can also act as a gateway, setting up 370 sessions for attached asynchronous terminals or for other systems over an Ethernet or IBM Token-Ring local-area network using the TCP/IP Telnet protocol.

Set to be available in September, the program is priced at \$400. IBM also announced the latest version of AIX/RT WHIP with DFT support.

• IBM AIX/RT Distributed Services and AIX PS/2 Distributed Services, which reportedly will allow the respective workstations to share data, printers and other resources over a LAN using IBM Systems Network Architecture LU6.2, peer-to-peer protocols, Synchronous Data Link Control or TCP/IP.

• The AIX PS/2 DOS Server Program allows PS/2 Model 80s running AIX to act as file or print servers for DOS Version 3.0-based systems running AIX. The server program converts data, files and commands between AIX and DOS formats, IBM said. The AIX/RT DOS Server was also announced.

• IBM AIX Access for DOS users allows an RT PC or PS/2 Model 80 to provide file- or printer-sharing services to an IBM PC or PS/2 running DOS Version 3.3. It also allows DOS systems to appear as asynchronous terminals to an AIX system.

Priced at \$150, the program reportedly will be shipped in March 1989.

• The IBM AIX PS/2 DOS Merge Program provides multitasking, multitasking execution of both DOS and AIX programs and sharing of files and resources between them. Priced at \$250, the program is set to ship in September.

Linking AIX with TCP/IP, Ethernet and DOS is part of "IBM's strategy to accommodate RFP checklists" of manufacturing, government and European firms that use such protocols with Unix, noted Marty Gruhn, executive vice-president of the Sierra Group in Tempe, Ariz. But AIX is still not part of IBM's main systems strategy, Gruhn added.

IBM also plans to have AIX participate in Systems Application Architecture (SAA), according to Jerry Latta, the company's group director of technical computing systems. SAA defines IBM's mainline system environments as well as common interfaces for communications and software development.

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## Pinpointing

FROM PAGE 51

These products help LAN network managers in three critical ways. They improve the manager's ability to quickly and accurately diagnose net problems, suggest network performance improvement strategies and aid in maintenance and charge-back administration.

But when do you need to invest in LAN diagnostic tools? According to Harvey Freeman, president of Lanworks, Inc., a



**T**O SAVE a long argument, I put the users in front of the network analyzer and show them exactly what their actions do to the network."

JOE HOLTZSCHER  
MCDONNELL DOUGLAS  
AEROSPACE INFORMATION  
SERVICES CO.

LAN system integration and support consultancy based in Minnetonka, Minn., it depends on the level of LAN complexity.

Added complexity, he notes, can quickly lead to dramatic growth in network service problems.

"The introduction of multiple vendors and/or the introduction of a bridge to another network leads to multiple protocols," Freeman says, "which complicates the task of isolating the source of network problems."

**Learning the hard way**  
When one of these complex LANs goes down, the resulting productivity loss may turn out to be more costly than the purchase of the diagnostic tool would have been. But managers often learn that lesson the hard way.

Ken Bosworth, president of International Resource Development, Inc. (IRD), a market research firm based in New Canaan, Conn., points out that "it often takes a major outage to convince an otherwise prudent manager that dollars spent on outage prevention are better investments than those some dollars spent on emergency recovery."

Network diagnostic tools can be purchased separately as LAN analyzers or as part of a vendor-specific LAN. However, the products mostly provide the same basic functions.

### The LAN detectives

Network analyzers are typically used to monitor network performance. They cannot monitor packets beyond bridges or gateways, because these LAN products filter out traffic directed to local addresses.

However, some LAN analyzers can decode higher layer protocols and analyze traffic passing through a bridge.

For example, an analyzer that can decode Transmission Control Protocol/Internet Protocol addresses can identify the source network of troublesome packets that have entered the LAN via the bridge.

LAN analyzers provide a statistical and sometimes graphic view of network performance. On a monitor, the tool can display every byte in the packets whizzing, or crawling, through the network. The manager can also set parameters to capture and display specific types of packets or different packet segments.

Some products also analyze the statistics and display the results of the analysis — for example, the number of bad packets sent by a given node over a given time span — as charts, graphs or diagrams.



Lanworks' Freeman

"LAN analyzers are both troubleshooting and operational analysis tools," Lanworks' Freeman points out. "In skilled hands, an analyzer can be used to determine if problems stem from either hardware or software."

According to Cecil Thornhill, president of Mathematica, Inc., an imaging software development firm based in Lakeland, Fla., a LAN analyzer helps clear up protocol-handling misconceptions for his staff. They can then more accurately determine whether hardware or software — or neither — is responsible for specific LAN problems.

In one recent case, Mathematica used Lanwatch, a LAN analyzer from FTP Software, Inc., when it was called in to integrate a multivendor hospital radiology diagnostic system.

The system ran over a LAN

with more than 100 nodes, which allowed the diagnostic radiology units to be wheeled into the rooms where they were needed and plugged into the LAN.

The diagnostic systems' computers used a different vendor's network interface boards. To complicate matters further, the computer systems on the LAN employed several versions of Unix with slightly different routines for handling network communications.

Mathematica used Lanwatch to pinpoint the hospital's LAN malfunctions.

"Without a network analyzer, it would have been very difficult to identify and unscramble the mixed cues and timing problems in the communications dialog," Thornhill says.

Network analyzers can depict the work load of a LAN server, workstation or group of network stations to determine who is loading the set down or to measure the performance of a workstation or server under a variety of load conditions.

This capability is particularly useful when planning network capacity.

### Policing the network

A side benefit of net diagnostic tools is that they can help net managers police and communicate with LAN users.

LAN manager Joe Holtzsch, president of system programming at McDonnell Douglas Aerospace Information Services Co. in St. Louis, says that most of his users obey network rules if the consequences of their rule violations can be graphically illustrated.

In managing a McDonnell Douglas LAN that has more than 200 nodes, Holtzsch uses a network analyzer to show users the problem. "Often, the user violating network rules thinks he is using the network correctly," Holtzsch explains. "To save a long argument, I put the users in front of the network analyzer and show them exactly what their actions do to the network."

Holtzsch adds, however, that when a LAN is connected to a bridge, it is impractical to educate every occasional user who enters the LAN from another network. To prevent these outside users from disrupting the LAN, he has used his analyzer to learn the characteristics of some of the most destructive network rule violations.

This information led to the building of a data filter trapped on the LAN bridge that traps packets that can cause problems and prevents them from entering the network.

"I prefer to use a combination of a TDR [time-domain reflectometer], two or three LAN analyzers and the network management tools provided by the LAN vendor," Holtzsch says of his diagnostic setup.

## Sorting it all out

**L**AN network analyzers fall into two categories — software-only tools and combinations of hardware and software.

Software-only analyzers usually cost less than \$1,500. They include Maynard, Mass.-based Digital Equipment Corp.'s LAN Traffic Monitor; Bloomington, Minn.-based Expertica, Inc.'s Vigilant; Boston-based FTP Software, Inc.'s Lanwatch; and Santa Clara, Calif., 3Com Corp.'s Etherprobe Network Utility. All run on IBM or compatible PCs.

LAN analyzer hardware/software products are priced between \$17,000 and \$25,000. They include the DRN-1700 Lancom Ethernet monitor from Communication Machinery Corp. in Santa Barbara, Calif.; Montgomery, Pa.-based Digilog, Inc.'s family of Protocol and Protocol Performance Analyzers; the Lanalyzer from Excelan, Inc. in San Jose, Calif.; HP4971S from Hewlett-Packard Co. in Colorado

Spring; The Sniffer, from Network General Corp. in Sunnyvale, Calif.; and Torrance-Calif.-based TRW, Inc.'s NIM2000.

AIM Communications, Inc. in Quakertown, Pa., offers a broad net analyzer called the Langrath Technical Monitor and Control System. Tolens/Scope Network Analyzer from Concord Data Systems, Inc. in Marlboro, Mass., monitors token bus nets.

Some diagnostic tools were developed by LAN vendors to be used only with their products. Examples include Mountain View, Calif.-based Bridge Communications, Inc.'s Network Control Server/AT; System 5101 Network Control Center from Sytek, Inc., also in Mountain View; and Santa Clara-based Ungermann-Bass, Inc.'s Network Control Console.

Also in this category are centralized host-based net management products like IBM's Netview and DEC's Network Management Control Center/VAX Ethernet.

NICK DALRYMPLE

He uses a Tektronix, Inc. TDR and LAN analyzers from Anoscia, Inc., Hewlett-Packard Co. and Network General Corp., as well as management tools from Ungermann-Bass, Inc.

### Going by wire

Outside users are just one source of problems beyond the direct control of the network manager. Sometimes, the installation and maintenance of the network wiring itself creates problems. In the city of New York, for example, LAN cable is installed and maintained by union electricians. Frequently, these electricians are not skilled in LAN installation techniques.

Because of this, a LAN man-

to be identified, first uses the cable testing function on his LAN analyzer, the Sniffer from Network General, to get a rough idea of where a cable fault lies. However, he says, to quickly isolate the exact location of the fault, the TDR is the right tool to use. His TDR is also from Tektronix.

Portable TDRs, or cable testers — such as the Model 1503B from Tektronix, E10N from Expertica, Inc. or cable testers from Cabletron Systems, Inc. — allow network managers to pinpoint cable and connector fault locations at the physical layer of the LAN. TDRs can be purchased for between \$995 and \$4,200.

Whether or not your LAN installation is complex enough to warrant buying a diagnostic tool, communications consultants say that in the future, LAN suppliers will provide more diagnostic capability built into the network tools.

In addition, artificial intelligence may get into the act. According to IRD's Bosworth, "We expect LAN vendors to provide expert system tools to aid the LAN manager in diagnosing problems and recommending specific actions."

Bosworth adds that network manager tools will continue to function in the dual role of network policeman and detective until more sophisticated and automated diagnostic tools are in place.



IRD's Bosworth

ager at a Wall Street brokerage firm says he has justified his TDR many times over by using it to accurately locate cable faults and loose connectors.

The manager, who asked not

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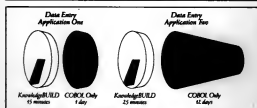
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## Connectivity tools in limelight at Unix show

BY PATRICIA KEEFE  
CW STAFF

DALLAS — The recent Uniform 1988 trade conference showcased more than the commercial viability of AT&T's Unix System V; it also featured a slew of related connectivity products.

Kicking off the parade of announcements was AT&T, which unveiled a software device driver said to support the "Berkeley" (Unix) Transmission Control Protocol/Internet Protocol (TCP/IP) utilities over Ethernet.

The TCP/IP Device Driver is compatible with systems using Unix System V/VME Release 3.1 and AT&T's WE 321SB VMEbus Single Board Computer.

This reportedly enables AT&T-based VMEbus systems to exchange files with, log on to and gain access to a wider range of computer systems.

The package runs with Communication Machinery Corp.'s ENP-10 or ENP-10 Plus VMEbus Ethernet board. Communication Machinery assisted AT&T in developing the device driver software and plans to take an active role in supporting AT&T customers.

Amdahl Corp. introduced the 4635 Communications Interface Unit and supporting software. It is said to enable users of AT&T's Datakit virtual circuit switch to significantly expand network size and throughput with links to UTS, Amdahl's Unix System V-based mainframe operating system.

The 4635 serves as a direct multiplexed interface between the mainframe and the Datakit switch, allowing asynchronous terminals and hosts attached to the switch to communicate directly with UTS via high-speed links.

### DEC world

Unix in the DEC world also got some attention. In a separate release, Communication Machinery announced support for AT&T's Streams I/O system and Remote File System protocol.

This support will be offered in three configurations. For Unix System V Release 3 VMEbus or Multibus system users, Communication Machinery will either complete the port or provide a Streams porting kit. Pricing will depend on the configuration.

Network Research Corp. announced a Network File System implementation said to give users the ability to host remote diskless Sun Microsystems, Inc. workstations from Digital Equipment Corp.'s VAX/VMS systems. Set to be available in the second quarter, pricing will range from \$250 for single-user DEC Vaxstations to \$4,500 for large VAX/VMS bus systems.

Network Research also unveiled Fusion Version 3.3 for VAX/VMS, which provides CITT X.25 support over TCP/IP networks. This gives users of Unix, Xenix and Microsoft Corp.'s MS-DOS the ability to tie into the Defense Department Network through connections to VMS systems. Set to ship at the end of the first quarter, Version 3.3 is priced from \$750 to \$4,500.

## Gibson

CONTINUED FROM PAGE 57

but not to the press (we got our mitts on one anyway) — contained point-by-point comparisons between DEC's and IBM's networking strategies, always casting DEC in a more favorable light.

One page of the handout, entitled, "IBM and Digital comparison," boasts a chart reminiscent of an old Anacin commercial. In this example, the illustration depicting IBM connectivity looks like a headache diagram, complete with jagged electrical lines, while the DEC side looks smooth and orderly, with an S-curve signifying NAS — the headache cured, if you will.

SAA was created to offer application portability across nearly all of IBM's disparate architectures. DEC has no need of this, because it has only one architecture, so all its VAX/VMS applications can run on all systems.

### Big problem, big solution

IBM's problem is greater than DEC's, but its solution may be larger, going beyond DEC's internal compatibility. SAA will make it possible for the applications to be portable across non-IBM equipment as well as IBM systems.

And IBM is actually freeing third parties and users from its hosts through peer-to-peer SNA and SAA. In other words, you could set up a true peer-to-peer network using someone else's

hosts as long as you (and they) support LU6.2 and PU2.1. Several non-IBM vendors have announced support for both.

In the meantime, DEC's claims to openness and multivendor connectivity largely depend on the company's promised migration to the International Standards Organization's Open Systems Interconnect (OSI) communications standard, which will not be viable for another year or two, most industry experts agree.

And while DEC supports LU6.2 as a way to link its own systems with IBM's, it resists supporting PU2.1 as a way to link them with other non-IBM computers.

SAA requires that applications be rewritten to its interfaces, however, which

In 1987 Microsoft put over 2,100,000 hours into research and development to introduce 21 new products and product updates. The work is hard.

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NEW PRODUCTS

Local-area network hardware

The Accudata Series II nodal processor, said to permit nonblocked digital cross-connecting of 64K bit/sec. channels for up to 43 T1 or CCITT X.25 channels, has been announced by Integrated Telecom Corp.

Features available include voice compression, data multiplexing, an integrated channel bank and CCITT X.25 networking. Nodal configuration, channel routing and system performance monitoring can take place from any point in the network,

the vendor said. The system can be equipped with automatic redundancy. The Accudata Series II is priced from \$10,000 to \$60,000, depending on the configuration.

Integrated Telecom, 630 International Pkwy., Richardson, Texas 75081. 214-234-3340.

Customer-premise equipment

Codex Corp. has announced its 6502 Packet Assembler/Disassembler, or PAD, and Netminder Configuration Manager.

The Codex 6502 asynchronous PAD provides access to a public data network or acts as a feeder for the Codex 6510 IXP in a pure CCITT X.25 network. It supports speeds to 8.6K bit/sec. Prices range from \$1,800 to \$4,400.

The Codex Netminder IBM Personal Computer AT-based software allows users to create, store and download configurations of Codex 6510 IXP X.25 processors and certain Codex multiplexers acting as feeder nodes to 6510 IXP X.25 networks. It costs \$2,000.

Codex also enhanced its Codex 6510 IXP Intelligent Network Processor to include an X.21 interface card; the ability for V.24 and V.35 interface cards to accept and provide clocks; a watchdog timer on the CPU card; and the ability to

broadcast message packets over multiple channels. It costs \$4,070.

Codex, Mansfield Farm, 7 Blue Hill River Road, Canton, Mass. 02021. 617-364-2600.

Links

White Pine Software, Inc. has enhanced its Apple Computer, Inc. Macintosh-to-Digital Equipment Corp. VAX communications software, called Mac240.

Mac240 Version 2.0 features user-installable network communications drivers, large-screen support and support for the new Macintosh keyboards. Other enhancements include the abilities to send multiple files with a single selection and to transfer only files modified since a specified date as well as the addition of national replacement character sets.

Mac240 provides DEC VT240 emulation, DEC VT220 text emulation, Teletext, Inc. 4010 and 4014 graphics, printer support and autodialing.

Mac240 costs \$199. Registered users can upgrade to Version 2.0 for \$25.

White Pine Software, Box 1108, 94 Rt. 101A, Amherst, N.H. 03031. 603-886-9050.

A family of hardware and software devices designed to link computer-integrated manufacturing (CIM) resources has been announced by VCM Systems, Inc.

Called the VCCIM network, the products are said to integrate personal computers, satellite cluster computers, graphics stations, independent data bases, printers, plotters, local-area networks and IBM host computers.

The primary system units are the VG 9500 channel control unit, priced from \$12,000, and the VG 9750 Communications Connector, priced from \$21,995. They are used with the VG 9250 graphics display station, which costs \$20,300, the VG 9625 Personal Data Station, priced at \$9,975, and VG Systems software modules.

A VCCIM system configuration can range from a connection of two similar devices to a complex system connecting many dissimilar devices.

VG Systems, 21300 Onward St., Woodland Hills, Calif. 91367. 818-346-3410.

Electronic mail

Personal computer-based software that allows users to set up and run computer conferences, electronic-mail systems and information libraries has been introduced by United Software Industries, Inc.

Called People-Net, the software runs under the Unix and Xenix operating systems.

Users have the ability to create identical, parallel conversations that reside simultaneously on one or more other People-Net-equipped sites.

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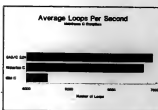
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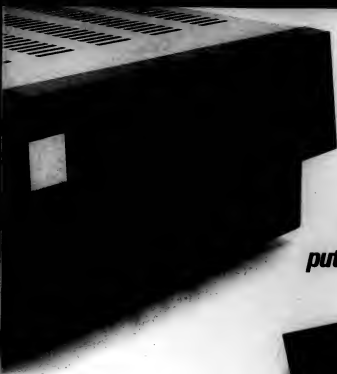
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# SYSTEMS & PERIPHERALS

## HARD TALK

Jean S. Bozman

### System/36 to live on



IBM's widely discussed Silverlake — the machine that will reportedly combine IBM's System/36 with its System/38 — appears certain, to many observers, to seal the doom of the System/36. But early reports of the extremely popular System/36's death are probably, like those of Mark Twain's passing, greatly exaggerated.

IBM will probably hedge its bets on the newest mid-range technology, industry analysts say. That's because the 250,000-plus users of the System/36 and 38 and, yes, the elderly System/34 keep producing golden eggs of revenue — and stable profits — for IBM.

So when Silverlake hits the street, it will probably stress System/38 features more than System/36 features. That would leave room for continued marketing of the IBM 5363, the youngest of the System/34, 36 and 38 brood, which was just hatched last fall.

#### Don't worry yet

"On Day One, Silverlake will not extend to the bottom of the System/36 line," says David Andrews, president of ADM in Cheshire, Conn. Andrews says low-end users will be affected the 5363, which will be enhanced as time goes on with more disk space and memory.

The anticipated marketing

Continued on page 67

## IBM broadens service horizons

Policy aimed at multivendor shops with relocation, installation needs

BY STANLEY GIBSON  
OF STAFF

Continuing its drive to be a one-stop supplier of all that a data center requires, IBM announced last month that it will, for the first time, perform site planning for computing centers that include non-IBM equipment. The offering also marks the first time IBM has offered mid-range and Personal Computer customers facility planning for installation and relocation.

"The point is, we are one

point of contact," said Ed Carriero, manager of contract services at IBM's National Service Division, summing up a main goal of the new offering, which is dubbed Site Management Services.

The services are the first of several portfolios to be included in IBM's Customized Operational Services, the goal of which is to provide the physical environment for data processing products, according to IBM.

The current offering expands on the assistance and counsel

that IBM has offered for years in designing all-IBM data centers, Carriero said. Previously, IBM would recommend what design measures to take, but the charges for its recommendations were not formally structured. Site Management Services calls for more specific recommendations and has fees for every design service, or module, Carriero explained.

The module for site planning replaces the Site Planning Services Solutions, which IBM withdrew. However, site plan-

ning is essentially the same as the Solutions, except that IBM will procure materials and select subcontractors. Site planning covers floor plan layout and the coordination of multiple sites. In addition, the module takes care of installation and customer setup of IBM and some non-IBM products.

Relocation services consist of three separately priced service modules: project planning and management, mover services and hardware services. Project planning and management provides a project manager to coordinate relocation tasks and also to deal with various vendors. Under mover services, IBM will

Continued on page 66

## Cubix designs multiuser 386 system

BY STANLEY GIBSON  
OF STAFF

CARSON CITY, Nev. — Tossing its hat into the ring with the increasing number of vendors of

multiuser systems based on the Intel Corp. 80386 microprocessor, Cubix Corp. recently introduced the Cubix/386.

Based on AT&T's Unix System V, the system can support

32 directly attached users, although more may be added through Cubinet, the vendor's local-area network.

Cubix/386 has an integrated Winchester disk, tape and floppy drive controller, memory and multiuser system intelligence on one board. To relieve overhead on the central processor, I/O peripheral devices are managed by separate processors, the vendor said. The system's random-access memory can be extended from 4M to 16M bytes in 4M-byte increments.

**Concurrent operations**  
Cubinet is Ethernet-based and allows IBM Personal Computers and compatible workstations to become nodes on the Cubix/386 file server. The LAN allows concurrent operation of DOS and Unix programs, the vendor claimed.

Cubinet requires a board in the Cubix host and is attached personal computers. The base price for Cubinet with the networking software, documentation and file server is \$1,595. Extra nodes cost an additional

\$995 each.

Cubix/386 comes with a built-in battery backup power supply. In addition, a software feature shuts down the system in the event of a power disturbance, which prevents system crashes, the vendor said.

The multiuser system will be sold to value-added resellers and OEMs that sell systems for applications such as accounting, inventory and departmental processing, according to Cubix.

A basic configuration with 4M bytes of memory, 170M bytes of disk storage, 60M bytes of tape storage and a Unix license carries a suggested retail price of \$13,995.

The Cubix/386 system will be available at the end of the month, according to the vendor.

#### Inside

- Data View Solutions adds multiuser MS-DOS system. Page 66.
- DG blade disk, tape storage systems in single package. Page 67.
- Sun announces 892M-byte storage module device disk drive. Page 70.

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## Firm adds MS-DOS 386 system IBM

CONTINUED FROM PAGE 65

NEWPORT BEACH, Calif. — Data Voice Solutions Corp. recently filled in the middle of its multiuser Microsoft Corp. MS-DOS systems line by adding a Centaur II capable of supporting up to 56 terminals.

The new system fits between the firm's 14-user Centaur II and 100-user Centaur II departmental systems. The Centaur II systems allow ASCII terminals to run popular MS-DOS programs by providing an application processor for each user. The systems also provide workstation users with Novell, Inc.'s Netware local-area network software.

Targeted at the large departmental processing market, the family of systems

is upgradeable in its 19-in. rack from the low-end 14-user work group to the 100-user model.

Centaur IIs are typically used with a voice/data private branch exchange, providing switched access to MS-DOS and Netware applications via standard terminals, according to the vendor. Using a switch, a set of application processors can support up to five times the number of terminals on a dynamic port contention basis, the vendor claimed.

Prices range from \$45,000 to \$120,000, depending on options selected. The systems are available for immediate delivery.

select and retain a common carrier to relocate the contents of the customer's data center.

Carriero stressed that IBM does not intend to go into the site planning business per se. Site Management Services are only offered in conjunction with the sale of new IBM equipment, he said.

IBM could subcontract the equipment move to someone else, such as the vendor of the non-IBM equipment, who is knowledgeable about the hardware and can assure that precautions will be taken so all warranty guidelines are met, Carriero explained.

"It's hard to say whether or not they're trying to get additional revenue or just they're the point of contact," a West Coast data center manager said. "I imagine there are some users who want to stay away from mainframe and minis," he added, explaining that those firms would generally be smaller ones. His own organization, a large oil and gas firm, feels better with its own staff doing the work rather than someone else, he said.

Another operations manager, who asked to remain anonymous, said the multivendor aspect of IBM's announcement is particularly timely, given the corporate trend toward acquisitions. She said her firm's data center was once entirely IBM but has since acquired other businesses and, with them, computer gear.

"We are now faced with merging data centers — with moving and maintaining disparate equipment," she said. "We occasionally hire consultants to do this. If IBM could really do this, it would be great."

A. S. "Migs" Damiani, president of Comsite International, Inc., a data center design and construction firm in Belleville, Ill., said IBM will not be likely to compete directly with his company but will probably use his firm or another like it as subcontractors.

"We don't look at them as a competitor, because IBM won't staff and do these things. Their main purpose in doing this is to increase their market share in hardware," he said.

Comsite has noticed that IBM sales agents have been offering Site Management Services in the Philadelphia area, Damiani said. "Customers are not taking them seriously. They know IBM will try to sell them equipment."

### Low-pressure approach

To put customers at ease about being subjected to sales efforts as part of the design process, Carriero said the sales staff will not take part in the design effort once the contract for Site Management Services is signed.

Despite his skepticism about IBM's chances for success in its new endeavor, Damiani said he will be happy to work with IBM if it is successful. "In a way, it would be easier dealing with one client, IBM, instead of with hundreds," he said.

Richard Forsythe, president of Forsythe McArthur Associates, Inc., a computer leasing company in Skokie, Ill., said his firm performs data center design and relocation along the lines announced by IBM. "It's a very profitable activity, and it's an activity that customers need. But it sounds easier to do than it is," he said, explaining that his company had to learn from experience how to carry off data center projects successfully.

"It requires a great deal of fancy footwork. Something always doesn't work out as planned. You have to do Sunday afternoon scrambling," Forsythe said.

Bob Gullo, president of Unicom, a computer leasing company in San Mateo, Calif., said his firm also offers data center planning and moving services. "The only place it has value is in the smaller account. The larger account has created a competitive atmosphere," he said.

The move by IBM represents an effort to return to being a full-service vendor, a profile Gullo said IBM has lost in recent years. "When you walk into a data center today, you're amazed when you see a data center that is all IBM. Five years ago, it was the opposite," Gullo said.

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## Bozman

CONTINUED FROM PAGE 65

of both the System/36 and Silverlake machines could be IBM's way to gear down for the System/36's eventual demise, according to Frank Gens, vice-president of technology assessment at International Data Corp.'s Financial Services Corp. in Framingham, Mass.

Gens says IBM may very well do what Hewlett-Packard did when it introduced the Spectrum series while continuing to market the older HP 3000 computers. IBM, Gens speculates, may want to see how well the System/36 community accepts Silverlake before the company decides to withdraw the System/36 from the market altogether.

Right now, it looks like IBM will signal users that Silverlake is for those who want advanced features — not inexpensive Systems Network Architecture (SNA) servers.

### Sex appeal?

"The people that want the sexy stuff will go for Silverlake," Andrews says, pointing to the enticements of unlimited upper growth, Systems Application Architecture and an IBM MVS-class operating system that come with the System/36's relational data base management system.

Andrews says Silverlake's prices will be tiered according to CPU power, which should help convince low-end System/36 users to stay with the System/36 — at least for now. Another factor some will have to consider is the difficulty of conversion to the new machine for low-end System/36 users.

Silverlake will be "a fairly new animal" for these users, explains Steve Santoro, administrative manager of Adroit Systems Management, a System/36 value-added reseller located in Syosset, N.Y.

Santoro says System/36 users are going to have a significant learning curve with the new processor. "They should be asking themselves whether they want to be the first ones on their block to own a Silverlake," he says.

### Practical answer

For those who find the extras of Silverlake unnecessary, the System/36 is still the practical answer, according to Dale Kutnick, an executive vice-president at Gertner Securities, a subsidiary of the Gertner Group. "If you need a System/36 for a dedicated application, something to get the job done today, then you can be confident buying a System/36 now," he says.

That is the path taken by Continental Insurance in Piscataway, N.J., and the Farmers Insurance Group of Companies in Los Angeles, both of which maintain more than 2,000 System/36s as remote processors in a distributed SNA network (CW, Feb. 8). Their faith in the System/36's staying power is backed up by analysts.

"Anyone who thinks the System/36 is going away the instant that Silverlake arrives is wrong," Andrews says. "Does Silverlake signal the eventual demise of the 36?" he asks rhetorically. "The answer is yes, but it will take years before the System/36 goes away for good."

Bozman is Computerworld's Chicago-based Midwest correspondent.

## DG packages disk, tape drives in single unit for MV family

WESTBORO, Mass. — Data General Corp. recently moved to integrate disk and tape storage systems in a single package with the introduction of the Combined Storage Subsystem (CSS) for the DG MV family of minicomputers.

DG also introduced two disk drives, a 14-in. 862M-byte drive designed for large, interactive environments and a 234M-byte 5 1/4-in. disk drive designed to reduce the cost of storage by as much as 32% for mid-range and high-end systems. The smaller disk drive and a 0.15-in.

streaming cartridge tape drive were designed for packaging in the CSS.

The CSS is used to support up to seven storage devices in a rack-mount chassis and allow a user to package disk, tape backup and interchange media in a single unit. The CSS is intended to provide flexibility and reduce the acquisition price for DG MV/7800 XP, MV/15000 and MV/20000 systems, according to Joe Clayton, marketing product manager for mass storage peripherals at DG. He claimed that one of the CSS with a 40-user

MV/7800 XP reduces the total system price by 11% and the five-year cost of ownership by 9%.

CSS configurations are priced from \$10,200. The stand-alone 21M-byte tape drive costs \$4,500. The 14-in. disk drive and controller cost \$34,700.

The 14-in. disk drive was designed to increase storage capacities on high-end systems by up to 57% while reducing the cost per megabyte by as much as 44%.

DG said the 0.15-in. 21M-byte streaming cartridge tape drive provides interchange compatibility with the low-end DG systems.

The 130M-byte half-inch read-after-write cartridge tape drive was designed for system backup at a sustained data transfer rate of 1.35K bit/sec.



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## NEW PRODUCTS

## Turnkey systems

A bar code data-entry module that enables the collection of attendance and labor-related activities has been announced by Profitkey International, Inc.

According to the vendor, the Attendance and Labor Collection module captures and enters data directly from the shop floor. Features include planned and unplanned setup and run-rate, indirect and move times, deviation quantities and codes, work center changes and attendance transactions.

The data-entry terminal is available as

a desk, bench- or wall-mounted unit. A bar-coding wand is required for each terminal. Up to 32 data-entry terminals can be connected to the Profitkey system.

The module costs from \$12,000. Complete hardware and software systems cost from \$20,000 to \$100,000.

Profitkey International, 283 Main St., Salem, N.H. 03079. 603-898-9800.

## Processors

MDB Systems, Inc. has introduced the Transverter-73 System, a product said to allow users of Digital Equipment Corp.'s PDP-11/34 computers to use

DEC PDP-11/73 CPUs and memory.

The system consists of a rear-loading 5 1/4-in. rack-mountable chassis, an 11/73 CPU and 1M byte of block-mode memory. It also includes MDB's bus interpreter transverter, consisting of one quad-size and one dual-size module. The board can be installed in Unibus and Q-bus backplanes.

Support is provided for direct-memory addressing transfers in both directions. Delay lines used in the transverter provide precise timing for signal and data transfers between the two buses and compensate for any de-skewing that might occur.

The Transverter-73 System costs \$6,590.

MDB Systems, Box 5506, 1995 N. Bu-

tavis St., Orange, Calif. 92613. 714-998-6900.

## Data storage

Sun Microsystems, Inc. has introduced an 892M-byte storage module device (SMD) disk drive.

The 9-in. disk drive is compatible with Sun's current subsystem controller. In addition, each 892M-byte subsystem can support one expansion drive. Users can link up to four disks per system for a total of 3.6 GB of data storage. Average access time is 15 msec, and the transfer rate is 2.4M bytes/sec.

The subsystem costs \$22,900. Expansion disk drives cost \$19,900.

Sun, 2550 Garcia Ave., Mountain View, Calif. 415-960-1300.

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GARTNER GROUP, INC.



A quad-height disk controller that interfaces up to four storage module device (SMD) and enhanced SMD disk drives to Digital Equipment Corp. VAX and PDP-11 Unibus systems has been announced by Distributed Logic Corp.

Called the DU256, the module interfaces drives with data-transfer rates up to 3M bytes/sec. to the VAX and PDP-11 systems. It contains a command-queue buffer that can store up to 21 commands from all drives, then queue them for the proper order of execution on each drive.

Other features include use of an elevator seek-ordering algorithm to determine the execution order and an automatic self-test function.

The DU256 is priced at \$2,950.

Distributed Logic, 1555 S. Sinclair St., Anaheim, Calif. 92806. 714-937-5700.

## Printers/Plotters

Intermec Corp. has announced a twin-axis adapter to connect Intermec bar code printers to IBM System/34s, 36s and 38s.

The Model 9176 Twinax Adapter connects the bar code printers directly to the IBM minicomputers or to IBM's 5251 Model 12 and 5294 controllers, allowing the bar code printer to emulate the IBM 5256.

The adapter converts IBM EBCDIC/Twinax protocol to ASCII/Intermec standard printer protocol.

The Model 9176 Twinax Adapter costs \$1,095.

Intermec, P.O. Box 360602, 4405 Russell Road, Lynnwood, Wash. 98047. 206-348-2600.

Honeywell Bull, Inc. has introduced the Model 4/20 and 4/21 dot matrix printers and has enhanced its Model 4/66 color dot matrix printer.

The 80-col. Model 4/21 feature draft-quality printing at 200 char./sec. and letter-quality printing at 40 char./sec.; 20 fonts; single-bin automatic sheet feeders; and serial or parallel interfaces. They are compatible with graphics packages for the IBM Graphics Printer.

Enhancements to the Model 4/66 seven-color, three-print mode device include a bar code printing facility. One model has been configured to emulate the Hewlett-Packard Co. 7475A printer.

The Model 4/20 and 4/21 cost \$645 and \$899, respectively. The Model 4/66 costs from \$2,795.

Honeywell Bull, 300 Concord Road, Billerica, Mass. 01821. 617-671-2517.

# IN DEPTH

## MIS slowly warms up to object-oriented programming

*The biggest payoffs of this new way of coding emerge in the second generation of applications*

BY PHILIP GILL

**R**elational data base technology was around for almost 20 years before it gained wide acceptance. Object-oriented programming languages may face a similarly slow route to MIS approval.

These languages may hold enormous potential to improve programmer productivity and cut application development time, but one vendor of an object-oriented programming language reports that the vast majority of its more than 2,000 licensees to date are not in the MIS realm.

One reason is that "MIS wants the same things they have always had," says Walter Zintz, a Concord, Calif., independent consultant who specializes in Unix and programming languages.

"MIS has a strong locked-in mentality," explains Tom Love, chairman of Productivity Products International, Inc. (PTI), the Sandy Hook, Conn., vendor of Objective-C, an object-oriented variant of the C language. The typical environment does not provide software code that is easy to maintain or reuse for new application development. That lock-in, Love says, "has caused many of the [application backlog] problems."

Unlike conventional programming languages, object-oriented ones are based on the concept of grouping similar and

related commands together in what are commonly referred to as "objects" or "classes." In such an environment, a programmer deals only with objects rather than lines of code. Objects can include lines of code or whole programs and can be reused or easily modified.

Despite MIS departments' reluctance to change, object-oriented programming language vendors are optimistic about the future of the technology with MIS management. Love claims his firm is experiencing a surge in interest among third-party developers of business applications

for users in the financial services and investment communities.

Object-oriented programming languages and techniques have been kicking around for two decades at institutes and engineering labs like Xerox Corp.'s Palo Alto Research Center (PARC) in California, but commercial products have been available for only the last five or six years.

"This industry is in its infancy," says Adele Goldberg, president and chief executive officer of Parcplace Systems, Inc. Also based in Palo Alto, Parcplace was spun out of PARC's re-

search and development labs almost two years ago. Its charter is to commercialize Xerox's Smalltalk-80, the first object-oriented programming language.

As with all new technologies, it takes time for the market to adapt and for the product to be fine-tuned, particularly in the area of performance. Many object-oriented language vendors liken their products' status in the MIS environment today to that of relational data base management systems in 1975.

At that time, the first commercial implementations of relational DBMSs were receiving a skeptical reception from MIS departments, which found them too new and unproven. Nevertheless, the technology has gradually won over MIS to such a point that no one seriously disputes its merit. In fact, the relational DBMS model sets the standard for DBMS implementations today.

### Not a match

Object-oriented programming languages face another problem that all new technologies must confront: Until the technology matures, performance does not match up to expectations. Response time is still slow compared with command-oriented languages, according to Ron Fisher, LISP project leader for Xerox AI Systems in Palo Alto. This Xerox operating group develops and markets LISP-based artificial intelligence systems to commercial and scientific users.

Object-oriented language vendors, like relational DBMS vendors before them, note that they must make the necessary improvements in reliability, response time and implementation. The vendors must also



- Steep learning curve, rich payoff
- Pure vs. hybrid languages
- One goal: object-oriented data bases

Gill is a San Mateo, Calif.-based freelance writer and editor who specializes in Unix and other computer-related topics. He is the former editor of *Unixworld* magazine.

provide a growing body of tools to aid application development.

Despite proponents' efforts, object-oriented languages remain, in large part, the tools of technologists and tinkers in scientific, research and engineering environments. Most applications developed using these languages tend to be in the more esoteric disciplines of AI and expert systems, Goldberg and Fisher agree.

Yet vendors cite some convincing reasons for this technology's eventual acceptance by MIS and a broad range of users.

The rise of Macintosh-like user interfaces. Apple Computer, Inc.'s Macintosh has popularized the icon user interface to such an extent that it is rapidly becoming the expected norm in user interface design and implementation.

**M**ANY OF THE first uses of object-oriented programming languages in MIS environments may be in rapid prototyping of user interfaces to new applications."

RON FISHER  
XEROX AI SYSTEMS

"The technology to do those kinds of user interfaces comes from object-oriented languages," PPT's Love says. Object-oriented programming is well suited to building icon user interfaces, which are more complex than command-oriented interfaces. Encapsulation and the ability to reuse code helps provide control in the

development process.

There is also a conceptual link between icons and objects. Icons represent whole categories of functions, such as word processing functions, grouped together under one heading or class. A user moves into more specific functions by working his way through a hierarchy of related

functions or classes.

A second icon might represent an electronic mailbox. A third might represent a communications program or electronic calendar.

Users' demands for better interfaces will highly motivate MIS to adopt object-oriented languages. "In some cases today, the user interface has become more important than the underlying capabilities of the product," Xerox's Fisher claims.

Fisher contends that many of the first uses of object-oriented programming languages in MIS environments will be in rapid prototyping of user interfaces to new applications.

Reusable software. The ability to get the most out of software provides the

*Continued on next page*

## Class act

**T**he concept of a class or object is central to all object-oriented languages. A class defines the data storage and data operations that may be performed on a particular data item or type. An object is a specific instance of a class and consists of a pointer to the class definition and some data storage.

A class has both a public part — available to any function inside or outside that class — and a private part — available only to other internal members of that class. This structure is key to reusing software developed using object-oriented languages. An application can be modified by changing the functions that act on the public part of a class, rather than by rewriting it.

Classes and objects have three main features: encapsulation, inheritance and dynamic binding.

- Encapsulation, used to organize a program into modules, allows data and procedures that can act on them to be coupled in a class. Encapsulation can take many forms, but it often means keeping a number of procedures in the same file.
- Only when encapsulation is coupled with a second characteristic, inheritance, can object-oriented languages provide their real payoff. Inheritance allows new classes to be developed using older classes with new variables.

For example, all graphics functions could be grouped into classes in a hierarchy. At the head would be a general program that incorporates graphics procedures. Additional data structures for graphics, such as a line, circle or square, could be linked. Thus, all functions could be applied to the line, circle or whatever shape you choose.

- Dynamic binding is key to reusable software. Its premise is that the functions contained in the module or class will always respond in the same way, regardless of the instructions that act on it. At runtime, a set of instructions different from those originally used may be applied to a module or class.

PHILIP GILL



# Hypercard: A good beginning despite missing features

What Apple Computer, Inc. did for mice, windows and icons, it may do for object-oriented programming languages. Apple's Hypercard, introduced last summer, is a new kind of programming environment that organizes all forms of information into what appears as stacks of index cards. Users then manipulate those stacks to create applications.

On a more technical level, Hypercard

consists of a limited number of instructions, plus objects and messages. Hypercard instructions are attached to objects. When Hypercard sends a message to a particular object, the object carries out its function.

How close is this environment to object-oriented programming? Apple Fellow Bill Atkinson has acknowledged that an affinity exists between Hypercard and Parcplace Systems, Inc.'s Smalltalk-80, said to be the first pure object-oriented programming language.

Ron Fisher, LISP project leader at Xerox AI Systems, says that while Hypercard offers some features of an object-oriented language, it lacks some important characteristics.

Foremost among the missing elements is inheritance. Inheritance means that an object can retain the functions of related objects in much the same way that a wire fox terrier, for example, inherits its capabilities and properties

from being a wire fox terrier but also from being a dog and a mammal as well.

Adele Goldberg, president and chief executive officer of Parcplace, agrees that Hypercard lacks much of the functionality of a true object-oriented language. However, in the long run, she says, that may not be so bad. Hypercard has the potential to introduce a large number of users to the concepts of object-oriented languages.

PHILIP GILL

## What ISDN is doing for McDonald's data networking capabilities is no small potatoes.

When McDonald's Corporation took a hard look at its telecommunications needs a few years ago, it saw 9400 restaurants in 46 countries, served by more than 20 networks. And a new restaurant opening every 17 hours.

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McDonald's will use ISDN to send voice, data and video over ordinary telephone lines simultaneously. An AT&T SESS™ switch at Illinois Bell will support digital phones, integrated voice/data terminals, facsimile, voice mail, host access and modem pooling, giving McDonald's a real competitive advantage in its data networking capabilities.

"In business language, this means we're going to do an even better job for the 30 million customers that we serve every day," said Bonnie Kos, McDonald's Vice President of Facilities and Systems.

"ISDN provides an information outlet to every workstation, thereby eliminating time-consuming and costly wiring, as well as enhancing messaging and network control capability."

Thanks to ISDN, McDonald's will enjoy better customer service, more current market information, better tracking of product promotions, more efficient inventory control, and reduced administrative workloads.

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## Object-oriented

FROM PRECEDING PAGE

biggest payoff for MIS by far. Object-oriented programming languages could relieve the applications backlog that plagues many MIS installations. The key is that these languages, in contrast to procedural languages, enable users to develop reusable software.

Programmers can develop modules, or classes, of functions that can be separated into their individual components. These classes can be reassembled in different ways to develop new applications.

Object-oriented data bases. A form of DBMS technology just now coming to market — object-oriented data bases — allows data to be grouped in ways that are impossible under the constraints of current DBMSs, according to Michael J. Caruso, director of research and development at Innovative Software Engineering, Inc.

The Cambridge, Mass.-based company markets Vision, a commercial object-oriented data base intended for investment banking and portfolio analysis applications. Caruso says the firm plans to expend its efforts to other applications areas.

While relational DBMSs restrict data to either text or integers that are linked through tables, files and relations, object-oriented data bases permit data to be linked through other means as well, Caruso says. For instance, an historical data base can be linked through a time series.

### Pure or hybrid

Object-oriented programming languages fall into one of two general categories — pure and hybrid. In a pure object-oriented language, programmers work in a computing environment that contains only objects. Smalltalk-80 is perhaps the best-known pure object-oriented language.

The second category, hybrid languages, adds object-oriented concepts, such as encapsulation, classes and objects, on top of conventional programming languages. "They provide the look and feel of a pure object-oriented language" but retain the characteristics of the command languages on which they were based, FTT's Love says. For instance, FTT describes Objective-C as "a commercial pre-compiler that adds Smalltalk-80 encapsulation, inheritance, classes, messages and objects to the C language."

Some of the more widely used languages that provide object-oriented capabilities are the following:

• C++, from AT&T, provides object-oriented programming capabilities to C

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communications by up to 100% over standard modems. Hayes' new V-Series Smartmodem 9600 is the first to use a 24-pin VMEbus interface, and the first to use Hayes' new Adaptive Data Compression (ADC) technology. Hayes' new Smartmodem 9600 is the first to use Hayes' new V-Series Smartmodem 9600. The new V-Series Smartmodem 9600 is the first to use Hayes' new V-Series Smartmodem 9600.

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## IN-DEPTH: OBJECT-ORIENTED PROGRAMMING CATCHES ON

programmers in the Unix environment.

- Objective-C, from PPI, is available for a variety of environments, including IBM Personal Computers.

- Object Pascal, from Apple, is the language in which much of the Macintosh user interface has been written.

- Hypercard, also from Apple, is a programming environment

that presents all data as stacks of index cards. There is some debate as to whether Hypercard can rightly be called an object-oriented programming language, however (see story page 73).

- The Common LISP object-oriented programming environment is a language available from many vendors, including Xerox AI Systems. Its product, dubbed

LOOPS, for LISP Object-Oriented Programming System, is used mainly in AI applications.

- Smalltalk-80, the first object-oriented programming language, is available from Parcplace. All commercial versions of Smalltalk-80 are licensed from Parcplace.

### Advantages not obvious

PPI's Love warns that the benefits of object-oriented programming languages will not be immediately apparent to users in the first generation of a pro-

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**O**BJECT-oriented programming will require an entirely different mind-set for programmers and systems analysts."

ADELE GOLDBERG  
PARCPLACE SYSTEMS, INC.

gram's development.

Parcplace's Goldberg agrees, noting that little if any independent analysis has been done of programmer productivity gains through this technology.

However, Love claims his company has seen substantial benefits during the second generation. Up to 60% of the program code is reusable, he says.

The major cost of this technology is in training programmers, Love says. Hardware is inexpensive because many of these programs are available for low-cost mass-produced personal computers and Unix systems. The software is also relatively inexpensive; prices range from \$500 to \$2,000.

The eventual success of these languages will depend more on design than cost. Goldberg says object-oriented programming will require an entirely different mind-set for programmers and systems analysts. She points out that programmers will need more extensive training in what constitutes good and effective design of user interfaces and the visual presentations object-oriented languages make possible.

Ultimately, Goldberg predicts, vendors will develop user interface objects that incorporate known rules and elements of good graphics design and visual presentation. These prepackaged objects will be portable from machine to machine and application to application. They will eliminate the need to train programmers in the principles of good graphics design as well as the intricacies of object-oriented programming technology.

In the end, Goldberg indicates, good taste may be just as important as good technology in determining the success or failure of these languages in the MIS community. ■



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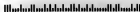
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## TAKING CHARGE

Eric K. Clemons

### Strategic necessities

There continues to be much interest in the strategic and competitive uses of information system applications, as evidenced by articles, conferences and executive education enrollments. Much of the hype — the excessive claims and unrealistic expectations — that characterized work in 1985 and '86 seems to be fading. Most firms have more reasonable expectations for their information systems ventures. In addition, more is now known by academic investigators and corporate decision makers.

Our research during the past four years has led us to formulate the strategic necessity hypothesis, which says that many, if not most, strategic applications of information systems have proven to be strategic necessities. That is, regardless of the system developers' original intent, most strategic information systems have not been a source of lasting competitive advantage. Rather, they have become new essential aspects of doing business. Getting them right merely yields parity; getting them wrong may force you out of the game.

This hypothesis, if true, has policy implications both when evaluating a potentially competitive application and when developing an MIS strategy.

Much support is available for the strategic necessity hypothesis. Some support comes from our prior expectations, based on traditional economics of competition, which state that when a firm earns supernormal profits, additional competitors will enter and these profits will be competed away.

More recent work by professor David Teece of the University of California at Berkeley addresses the

"appropriability" of benefits from innovation. Teece has found that in some instances, the first developer earns greater profits, perhaps for an extended period of time, but does not always win as a result of innovation. He developed a simple

Continued on page 80

## The Feds' dynamo

Exec is salesman, motivator and life of the party

BY MITCH BETTS  
OF STAFF

ALEXANDRIA, Va. — Joseph J. Leo, a senior manager at the U.S. Food and Nutrition Service, is trying to modernize the information systems that support \$20 billion of the nation's most critical services, including the food stamp, welfare and school lunch programs. He doesn't have much time for vendor hype.

At a symposium on federal systems in December, Leo listened to some lofty sales pitches and then took the podium to deliver a withering critique. "Give me a migration path," he told the vendors, with characteristic bluntness. "I have to manage in three different worlds: the past, the present and the future."

Later, in an interview, Leo smiled and said, "The vendors will tell you that everything is possible when, in reality, it's not."

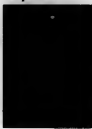
### Tough stance works

Although Leo is tough on vendors, he is also known as a tough manager at the Food and Nutrition Service, part of the U.S. Department of Agriculture. As deputy administrator for management, Leo is in charge of an odd assortment of offices: information systems, personnel, civil rights and administrative services. In addition, he serves as chairman of a special committee that provides guidance to all 50 states on the use of computer systems for public welfare programs.

"He's definitely a tough manager," says his boss, Anna Kondratas, administrator of the

## PROFILE

Joseph J. Leo



**Position:** Deputy administrator for management, U.S. Food and Nutrition Service.  
**Education:** Running a tight ship, selling programs, motivating by communicating excitement, charting the future.

agency. "But that's positive from my point of view, because he runs a very tight ship," she says, noting that the agency's systems modernization program is well coordinated and running smoothly.

Leo likes to keep his workday down to 10 or 12 hours — "one step short of being a workaholic," he says — and spends his free time with friends, his sports car and planning an upcoming trip to Europe. "My generation grew up with the adage: Work hard, play hard," he comments.

Along with an occasional outburst of temper, Leo is known for having a high energy level and extraordinary enthusiasm for his work, according to Kondratas. In fact, for years he has

Continued on page 81

## BOEING COMPUTER SERVICES

### Channeling the information stream

BY DAVID A. LUDLUM  
OF STAFF

With 45,000 workstations or terminals, 450 minicomputers, 54 mainframes, supercomputers and its development of communications standards, Bellevue, Wash.-based Boeing Computer Services Co. (BCS) is conspicuous among large and innovative users of information technology.

And with more than 1,500 customers in government and industry, many desiring systems integration, the computer services division of The Boeing Co. is also a prominent example of the potential for such users to sell products and services to other companies.

But BCS, which centralizes most major systems activities at Boeing, has also been making strides in other realms of the management of information technology, such as controlling costs, supporting corporate strategy, educating personnel and keeping abreast of new technology.

Like the commercial MIS arms of most aerospace firms, BCS, whose earnings are not made public, makes a negligible contribution to its parent company's bottom line, according to Paul Nisbit, an aerospace analyst with Prudential-Bache Securities, Inc.

However, BCS's commercial activities seem to offset the costs and expand the capabilities of its internal services, Nisbit says. "Undoubtedly, they've streamlined their engineering and manufacturing processes due to the very sophisticated systems in place internally," he says.

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BOEING**

Such accomplishments come in response to major upheavals in Boeing's business environment. Airline deregulation and new competition from the European consortium Airbus Industrie have put downward pressure on the prices Boeing can charge for its commercial aircraft.

Among Boeing's responses has been the firm's adoption of Japanese-style "design/build teams" — an effort to boost efficiency and cut costs by coordinating designs more closely with manufacturing requirements and budget constraints.

Continued on page 84

## MANAGERS ON THE MOVE

### Tending to the client's technical needs

Richard Leogant has been named senior vice-president of Information Services at CUC International, Inc. in Stamford, Conn. The company provides credit card enhancement services such as shopping, travel, insurance, extended warranties, prepaid legal plans and credit card registration.

Along with software development, data processing and data entry, in his new position, Leogant is responsible for serving as a liaison to CUC's marketing department for service and support of the banks and retailers that are CUC's clients.

The responsibility reflects a



CUC's Leogant

"technical relationship" between CUC and the clients that parallels their marketing relationship, Leogant explained.

"We want to be smooth and operationally efficient. If [clients] are making money but things aren't running smoothly, they're not going to be happy," he said.

Leogant was previously senior vice-president of Mortgage Administration at the Federal National Mortgage Association, where he directed a 500-employee operations group. Prior to that, he was director of Information Services at the Student Loan Marketing Association.

Steve Hicks has been promoted from director to vice-president of Management Information Services at Whittle

Communications L.P. in Knoxville, Tenn., a publisher of magazines, newsletters and videos.

Thomas F. Berns has been named director of business systems development for Firestone Tire & Rubber Co.'s retail operations in Chicago. Berns joined Firestone after serving as vice-president of information services at Baxter Healthcare Corp., located in Deerfield, Ill.

Kimberly L. Clawson has been promoted to operations manager in the Management Information Services department at Keller-Crescent Co., an Evansville, Ind., advertising agency.

## Clemons

CONTINUED FROM PAGE 79

model to predict who will retain the benefits from a new product or service—the innovator, one or more imitators, suppliers or customers.

When there is a tight appropriability regime—patents or trade secrets or an innovation that is difficult to codify or is embedded in such a way as to discourage reverse engineering—the innovator is likely to retain benefits. Conversely, with a weak appropriability regime, benefits will be competed away.

When there is a competitive factors market—many suppliers exist for the necessary factors of production, and competing suppliers can exert little pressure on the developer of the innovation—the innovator will retain benefits. However, when the supplier of key resources has significant bargaining power, the innovator will find many of the economic benefits of his development accrue to the supplier.

Unfortunately, MIS applications rarely have the characteristics that allow an innovator to retain economic benefits. Patents are rarely available, trade secrets are of limited effectiveness and the functionality of applications like customer order-entry systems are visible to all competitors.

Since the key resources—data processing equipment, telecommunications capacity or automated teller machines (ATM), for example—are commodities available to all competitors, Teece would predict that under these circumstances, all competitors with similar strategies would develop similar systems and benefits such as reduced costs or improved service would be retained by customers.

Evidence in pharmacoeconomics industry case studies during the past several years have yielded some evidence that supports this prediction. Perhaps the most striking example is in the distribution of pharmaceuticals and health and beauty aids to pharmacies.

A previous column described McKesson's Econosystem electronic order-entry system. Currently, more than 99% of McKesson's customers order electronically. Use of this system, and integration to exploit the data it captures, has enabled McKesson to make significant productivity gains: warehouse worker productivity is up tremendously, and in a period in which sales increased sixfold, McKesson's sales force has been reduced by 50% and telephone order-entry clerks reduced from 700 to 15.

Significant competitive impact on McKesson is more difficult to demonstrate. Most major competitors developed similar systems with similar capabilities at approximately the same time. In the decade following the system's introduction, McKesson's national market share remained essentially unchanged at 20%.

It appears indisputable, however, that customer order-entry was strategic in this industry. Smaller competitors, unable to develop competing systems, left drug distribution: from 1975 to 1986, the number of drug distributors was reduced by almost 50%. We believe that these distribution systems rapidly became strategic necessities.

Benefits from these systems—reduced operating costs and reduced prices

were largely passed through to pharmacies and independent drugstores, enabling them to compete more effectively against supermarkets and chain stores. Even the smaller distributors that were acquired appear to have benefited: as the holder of a key factor—the market share needed to make these strategic order-entry systems cost-effective—most were acquired by major firms at a significant premium above book value.

Thus, these systems appear to be beneficial strategic necessities, benefiting all aspects of the industry.

The strategic necessity hypothesis has clear policy implications for corporate decision makers. When it appears that competitive advantage may be possible, the decision maker must assess the op-

portunity critically and skeptically. What will make it competitive? How will benefits be kept, and how will competitive advantage be defended? If it is truly a competitive opportunity, determine the importance of speed, which is tied to first-mover effects.

When assessing applications, a reasonable expectation for strategic systems appears to be strategic necessity. For strategic necessities, decision makers must ask themselves the following question: Can your firm do it all? If the answer is no, the firm has four principal options: exit the industry, merge with additional players, form a joint venture, or join a consortium to develop the innovation. If the answer is yes, the firm's principal decision is between independent or coopera-

tive development.

Finally, if the firm has some special advantage in development, it should consider developing and selling the innovation to any or all industry participants. An industry's strategic necessity may provide competitive advantage for a supplier.

Provident National Bank has a profitable business processing asset-management accounts for many brokerage houses competing with Merrill Lynch's Cash Management Account. And Philadelphia National Bank has developed a profitable business in the switch for a regional ATM consortium.

Clemons is associate professor of Decision Sciences at the University of Pennsylvania's Wharton School.

# HOW CORPORATE ANSWERED THE



"Evaluating every graphics package available would have taken time and information rather resources we couldn't spare. But we needed to know which package was right for us. And we needed to know fast."

Karen Mahoney, Senior Systems Analyst of Office Automation, Pepsi-Cola International (a Division of PepsiCo, Inc.).

When Pepsi-Cola International turned to Corporate Software for answers, their words were clear. The graphics packages they'd been using were no longer meeting their needs. They wanted a new generation—a more powerful product that could easily interface with their existing applications.

Corporate Software's support service helped us determine that

## Feds' dynamo

CONTINUED FROM PAGE 79

been known as "Dynamo Joe."

"Most staff meetings are ho-hum affairs, but Joe manages to stay enthusiastic. I heard he once gave a six-hour briefing without losing any energy, although I'm not sure everyone else managed to keep up with him," Kondratas says.

"He's knowledgeable, people trust him, and he believes in what he's doing. The result is that he manages to convince everyone to go along with his plans," Kondratas adds.

Leo calls himself a new breed of government executive — one who can point to a combination of management and

technology experience.

That combination is rare among government information systems executives, says Robert V. Head, a technology consultant and former Agriculture Department official.

### Night mix of skills

One advantage that mix of skills provides is that Leo is an excellent manager of major systems procurements, Head says. His agency recently awarded a \$12 million contract for a distributed information system based on IBM 9370s — without any of the protests and controversies common to government procurements.

"Maybe [other federal managers] should take a seminar from Joe Leo on how you do these things," Head says.

Leo points out that computer experience has been an important skill in his management "tool bag" and helped him to win his current job.

He began his government career in 1971 as a management analyst at the U.S. Department of Transportation, and as he moved up the ladder, was frequently put in charge of various office automation projects.

That experience paid off in 1984, when he was thrust into a four-month competition with 80 applicants for the management job at the Food and Nutrition Service.

The agency wanted to move the control of information systems from the comptroller's office to the management office, so the winning applicant had to

have computer experience. Leo clinched the job when he recommended that the agency stop buying 8-bit personal computers and switch to the 16-bit systems that were about to hit the market.

### Keeping pace

Leo says he continues to invest in his technical skills by reading computer trade journals, mostly so he can maintain a vigorous, professional dialogue with the technical staff.

The executive sees his role as that of a leader who can motivate his staff by communicating "excitement about the future and an understanding of the pressures on the day-to-day managers in the present." He maintains that a staff must feel a sense of commitment from the top.

Actually, Leo's information systems staff might wish he were a little less involved in technical programs, he says with a chuckle.

"But if I make the investment in staying on top of automation, I'm not going to ignore that investment. When I sit at a conference and hear something that conflicts with my view of the future, I'm going to say so," he says.

### Love or respect?

"I know members of my staff who say they respect him and like to work with him," Head says. "But I don't think they would describe him as lovable."

What drives him to be a tough manager? "Maybe it's because I never really had any breaks. I've had to work very hard [to advance in the government], one step at a time," Leo says. And he expects the same hard work from his staff.

While Leo may not be lovable, he's a lot of fun at a party. "He's a terrific dancer," Kondratas reports. "He loves ballroom dancing, and he's the life of the party at any of our agency functions."

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## CALENDAR

### INTERNATIONAL

Third International Conference on CB RDBS, Seattle, March 1-3 — Contact: Sherrie Emerson, Microsoft Corp., Box 97017, 18011 N.E. 28th Way, Redmond, Wash. 98073.

### MANAGEMENT

Northeast Conference of the North American Honeywell Users, Marlborough, Mass., March 6-10 — Contact: Leo Pace, HARRIS, P.O. 2057, Waltham, N.J.

Integrated Database Management Systems User Association Annual Conference (IDMSA 88), Orlando, Fla., March 6-10 — Contact: Kathleen Mills, IDMS User Association, Suite 600, 111 E. Wacker Drive, Chicago, Ill. 60601.

2nd IBM Conference on Computer Workstations, Santa Clara, Calif., March 7-10 — Contact: Computer Society of the IEEE, 1730 Massachusetts Ave. N.W., Washington, D.C. 20036.

Federal Office Systems Expo (FOSB) '88, Washington, D.C., March 7-10 — Contact: Debra Murray, Neume & Todd Productions, Inc., Suite 400, 2111 Eisenhower Ave., Alexandria, Va. 22314.

Ninth Annual Conference on ERP Performance/Capacity Management, Scottsdale, Ariz., Mar. 7-11 — Contact: Applied Computer Research, Inc., P.O. Box 9200, Phoenix, Ariz. 85068.

Seybold Seminars '88, San Francisco, March 7-11 — Contact: Seybold Seminars, 6822 Middle Road, Dublin, Calif. 94568.

IBM Ware and Ware, Atlanta, March 8-9 — Contact: Automotive Industry Action Group, Suite 208, 17117 W. Nine Mile Road, Southfield, Mich. 48075.

CAP '88 West, Los Angeles, March 8-10 — Contact: Computer Aided Publishing, Inc., Suite 200, 90 W. Montgomery Avenue, Rockville, Md.



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\*Based on an independent survey of major brands. †Based on an independent survey of 200 FORTUNE 1000 companies.





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It simply works better.

## Channeling

FROM PAGE 79

The teams include design engineers, material specialists, manufacturing engineers and BCS information systems professionals.

"Coordination of that kind is best handled by an information system," says Del Rowan, assistant to the president at Boeing. "To do that, obviously you need the information systems people." Rowan emphasizes that Boeing is revamping production processes before automating them. "It does little good to take

a manual system that has been in place and simply automate it," he says.

### All for one

In a speech last fall, Robert Dryden, then president of BCS, described the team approach as part of a breaking down of organizational barriers that is accompanying an effort by Boeing to streamline processes around a flow of digital information.

In other efforts to boost efficiency, BCS has implemented advanced systems for design, engineering and manufacturing as well as for cost analysis of design options.

Airline deregulation, along with volatile prices for jet fuel, has also placed a premium on flexibility in Boeing's production. BCS has helped address that need with design and manufacturing data bases that accommodate production of various models of a basic aircraft design and with systems for scheduling manufacturing resource planning.

In his speech, Dryden, who was succeeded by longtime IBM marketing executive Michael Hallman after being appointed president of Boeing Military Aircraft Co. last fall, stressed that much of Boeing's production is essentially information processing.

"Our vision of what we want this process to become is that of an enhanced information stream," Dryden said. "What we are doing to implement that vision is rebuilding the company around the concept of that enhanced information stream."

Sharing information has enhanced Boeing's customer service by allowing documentation to be based on original design and manufacturing data, according to Dryden. BCS has also supported customer service with systems for worldwide tracking of spare parts inventories and for troubleshooting with artificial intelligence.

### Enhancing skills

The development of AI technology has been a major thrust at Boeing since the early 1980s, when the U.S. Air Force advised contractors to pursue it and a company task force concluded it was crucial to Boeing's competitiveness.

But the company found itself with a demand for AI experts at the master's degree level that far outstripped the available supply, according to Bruce Wilson, BCS's chief scientist for computing technology. The company estimated it needed "about 150 trained folk" but could only bring about one on board every two years, Wilson says.

That led BCS to launch its Associates Program in 1984 — recently renamed the Skill Enhancement Program — which is run out of its Advanced Technology Center for Computer Sciences, a 5-year-old facility aimed at acquiring and developing technology and disseminating it to Boeing operating companies.

The Skill Enhancement Program is aimed at cultivating AI know-how within Boeing and fostering the application of AI to procedures and products. It provides graduate-level training to experienced software engineers from the Boeing companies.

"It's a transfer mechanism for allowing us to move the technology evolving inside the center out to the operating companies," says David Fennell, manager of the program.

The Skill Enhancement Pro-

gram, which takes students in groups of about 10, involves six months of prototype development and an optional, introductory half-year of training. The first class graduated in February 1985; since then, the program has produced 68 alumni. "The labor costs are on the students' own organizations, so they tend to pick good people," Wilson notes.

One fruit of the program is Boeing Electronics Co.'s Connector Assembly Specification Expert, an expert system for helping workers assemble electrical connectors. It provides a printout of assembly instructions, avoiding the need for workers to search hundreds of pages of documentation. The firm says the system, which runs on a Digital Equipment Corp. Microvax, should save Boeing \$10 million per year when it is fully deployed.

Through its Education and Training Division, BCS has ex-

tended its AI instruction to others, including employees of a group of Japanese companies, through a joint effort with the Tokyo trading company Nishio Iwai. The Skill Enhancement Program will be extended to include training in high-speed computing and perhaps other areas, Fennell says.

The Advanced Technology Center also strives to keep BCS abreast of the latest technologies. It oversees Boeing's relationship with the Carnegie Group, Inc., a Pittsburgh firm specializing in the application of AI to manufacturing and engineering in which Boeing has purchased an equity stake.

The center also runs programs that bring scientists and researchers to Boeing for one- or two-day colloquia or visits that last several weeks, during which they consult and test ideas, an undertaking Wilson calls the "rent-a-professor" program.

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# COMPUTER INDUSTRY

## INDUSTRY INSIGHT

Clinton Wilder

### Combine and conquer



The season of the deal. Less than eight weeks into 1988, the industry has already seen three acquisitions valued at more than \$200 million. If that pace continues, maybe the industry's consolidation really will go the way of the auto industry, as some sagas have survived for years.

Computervision finally gave in to Prime, creating a potent new force in computer-aided design and manufacturing. Then, last week, Tandem, whose name you see more and more in sentences that also contain the word "networking," moved to annex a big chunk of communications expertise with its proposed buy-out of Ungermann-Bass.

The third prominent nine-figure deal was struck 10 days ago with the \$235 million sale of Mitech, the Dallas-based service bureau for banks and financial firms. Mitech is a classic case of a large corporation — Dallas banking giant MCorp — making a lot of money by getting into the computer services industry and spinning off the operation as a separate business.

In this case, Mitech became a corporate cash cow when its parent skidded on the oil industry slump. After milking the profits, MCorp sold the whole cow — its 80% equity stake — to help its bottom line. The bank has lost \$340 million in the last two years.

**Headed in Bass**  
The Mitech sale brings an interesting new player (players, actually) into the industry: the Bass brothers, the noted wheeler-dealers from Fort Worth, Texas, who graced the cover of *Newsweek* a couple of years back.

The Robert M. Bass Group will share Mitech ownership with Welsh, Carson, Anderson & Stowe, New York venture capitalists that are no strangers to high tech.

The idea might be far-fetched, but the thought of the Bass boys making their Texas *Continued on page 20*

## Tandem to buy Ungermann-Bass

\$260M deal will stave off further DCA takeover advances

BY JAMES DALY  
CIVILIAN

SANTA CLARA, Calif. — Ungermann-Bass, Inc. buried any chance that Digital Communications Associates, Inc. (DCA) might attempt another hostile takeover by announcing last week that it will be acquired by Tandem Computers, Inc. for approximately \$260 million.

In the latest of a 12-month flurry of mergers involving networking companies, local-area network vendor Ungermann-Bass agreed to become a wholly owned subsidiary of Tandem, the Cupertino, Calif.-based supplier of computer systems and networks for on-line transaction processing.

The emergence of Tandem as a white knight draws the curtain on a drama that began shortly after last October's stock market crash, when DCA made a \$175 million offer to acquire Ungermann-Bass at a time when the latter firm's stock was down.

The bid was seen by some analysts as an opportunistic move on DCA's part and was unanimously rejected by the Ungermann-Bass board of directors shortly thereafter. But Alpharetta, Ga.-based DCA made no secret that it was still interested in the company and retained one million shares of Ungermann-Bass stock, or nearly 6% of the firm.

"Clearly, the DCA takeover bid caused Ungermann-Bass to

look over its shoulder," said Bob Kimball, a senior research analyst at Montgomery Securities. "I suspect [discussions with Tandem] started out as an OEM talks to solidify their relationship, then progressed to a minority interest investment and, finally, an end-out-buy."

Following the merger, Ungermann-Bass will operate as an independent division of parent firm Tandem.

Ungermann-Bass cofounder and Chief Executive Officer Ralph Ungermann will become a vice-president of Tandem and will be nominated for election to Tandem's board of directors.

### Talking for months

Mike Gardner, Ungermann-Bass's vice president of marketing, confirmed that buyer-seller talks had been going on with Tandem for the past four months but denied that the merger was spurred by the takeover bid.

"We have worked with each other on projects in the past and found it to be a natural fit," Gardner said. "The market is moving to distributed intelligence in computing, distributed data bases, high-availability systems and transaction processing. Local-area networks are the glue that combines these converging technologies together."

Both companies also share a common user base in the financial services, manufacturing and telecommunications fields and are committed to open networks

*Continued on page 20*

## Cray opens software war chest

BY ALAN ALPER  
CIVILIAN

NEW YORK — Responding to the needs of its expanding base of commercial customers, Cray Research, Inc. is increasing expenditures on operating software development, according to John Rolwagen, chairman and chief executive officer.

The Minneapolis supercomputer company spent about \$109 million on R&D last year, 40% of which was devoted to software development. Rolwagen told securities analysts at a recent meeting here. By next year, Cray will spend as much on software as it does on hardware development, he added.

Cray is allocating additional resources to ensure that Unicos, its AT&T Unix System V-derived operating system, contains functionality that is equivalent to its COS proprietary operating system. Unicos has taken on increased importance within the Cray product line and is offered as the standard operating system *Continued on page 20*

### Inside

- Coldest poets \$3.9 million loss, looks toward blacker pastures. Page 87.
- Arthur Andersen opens CIM demo center. Page 87.

## At A Glance



CV CHART

## Software firm tackles Olympian project management task

BY NELL MARGOLIS  
CIVILIAN

CAMBRIDGE, Mass. — Project Software and Development, Inc. (PSDI) is staging the biggest product demonstration in its 20-year history this month, and the whole world is watching.

Olympic sponsor and supplier PSDI's project management software is at work in Calgary, Alberta, planning, scheduling and managing more than 30,000 activities relating to the 1988 Winter Olympic Games.

For PSDI, Olympic supplier status is more than just an advertisement worth its weight in gold, silver and bronze. It is the software maker's chance to prove that project management is not just for aerospace and construction companies.

### PSDI founder Daniels

The message is critical if privately held PSDI is to keep up or exceed the average 25% annual growth it has enjoyed since it was started, according to Robert L. Daniels, the firm's founder and chief executive officer.

"People tend to get very emotional about project management," he said. "It's not just a technology, it's a discipline, a way of thinking — and it's highly particularized to each separate project."

At the Winter Olympics, the sports events and related activities — including food service, security, medical backup, transportation and training of volunteers — have been broken down into 15-minute or shorter time periods to be tracked, monitored and modeled. This is handled by PSDI's Digital Equipment Corp. VAX-based Project/2 software and its newer Microsoft Corp. MS-DOS-based Quiknet Professional for microcomputers.

The effectiveness of PSDI's attempt to alter the image of project management through

what amounts to a televised reference will take months, if not years, to fully evaluate. However, even before the final medals are handed out in Calgary, PSDI appears to be scoring.

In the two years since the company started promoting its Olympic connection, its products have gained a foothold in industries such as broadcasting, finance and entertainment, according to Vice-President of Marketing Dennis Martineau.

### On the rise

The \$30 million company recently closed a record \$10.3 million quarter — up 47% over last year's comparable period — and is looking to increase its 300-member work force by 15%.

Daniels started PSDI in his *Continued on page 20*

# On April 2, IBM made PC history. Eight weeks later, we rewrote it.

## IDEAssociates Is the First Out of the Gate with 5251 Emulation Board for PS/2

By Rob Garrettson

BILLERICA, MA.—IDEAssociates Inc. has introduced a 5251 emulation board for the IBM PS/2, beating IBM out of the blocks by five months in the race to connect the new micros to its System/36 and System/38 minicomputers.

The new IDEAcomm 5251/MC, which will be available to users next month, is compatible with IBM's Micro Channel Architecture used in the PS/2 Models 50, 60 and 80, according to Cathy Efthimiou, an IDEAssociates marketing manager for communications products. The new board connects the PS/2 via twinaxial cable to a System/3X or controller and allows the PC to emulate an IBM 5251, 5291, 5292 or 3180 terminal.

IBM's System 36/38 Workstation Emulation Adapter/A for connecting a PS/2 to a 3600 or 3090 is not scheduled for availability until next year. Other third-party companies, such as Digital Computer Systems and the PDP-11, also offer emulation boards.

## IDEAssociates 1st To Link PS/2

BILLERICA, Mass.—IDEAssociates Inc. said last week that it would be the first company to deliver a 5251 emulation board connecting IBM's Personal System/2 Models 50 and 60 with Sys-

tem/36 and 38. Scheduled to begin shipping in May, the company's IDEAcomm 5251/MC (Micro Channel) will provide capabilities including support for IBM 3180 terminals, system printer emulation and support for windows with sessions, IDEAssociates

Channel from IBM. The quick-made board uses a new board uses a twinaxial cable to connect Micro Channel-compatible micros to the S/3X or to a System/38 controller. It will emulate IBM Models 11, 5291 and 5292 terminals. It can be used to monitor a color or monochrome monitor.

Efthimiou, a spokeswoman for IDEAssociates, said the new board is a fully compatible Micro Channel board.

April 2, 1987.

To most computer add-on companies that was the date IBM dropped the bomb. With the introduction of PS/2 personal computers, the Micro Channel\* revolution had begun.

The effect on our competitors? Many were prepared to do a little more than count big inventories of emulation products for old PCs.

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The result of these efforts is an add-on board that redefines the limits of PC communications. It provides 5292 Model 2 emulation. Support for 132 columns in 3180 emulation. And windows to monitor the real time status of multiple sessions on one PC screen. Q38 Technical Journal declared, "...while IDEAA is delivering an emulation card that works completely, the other guys are just playing catch-up."

Which, historically speaking, is exactly the position we're inclined to take. For more information on the IDEAcomm 5251/MC, call 800-257-5027.

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## Cullinet loses \$3.9M in quarter

WESTWOOD, Mass. — Cullinet Software, Inc. last week reported what it has targeted as the last of its current series of losing quarters. The data base management software firm said its net loss, excluding a one-time charge, narrowed to \$3.9 million, or 12 cents per share, compared with \$5.4 million, or 17 cents per share, a year earlier.

Revenue in the third fiscal quarter ended Jan. 31 grew 21% to \$54.2 million from \$44.7 million in the year-earlier period. The company said international business was particularly strong and now accounts for 32% of Cullinet's revenue, up from 23% one year ago.

Revenue from the sales of new products, however, was down slightly, from \$22.6 million a year earlier to \$21.9 million. License renewal fees and service revenue grew 46% to \$32.3 million.

Cullinet's actual net loss was \$12.7 million, or 39 cents per share, reflecting a

pretax charge of \$13.7 million. That charge was attributed to the write-down of project management software product assets that Cullinet acquired when it bought Planning Control International, Inc. in 1987 (CW, Feb. 8). Analysts called the write-off an attempt by Cullinet to "clear the decks" for a return to profitability.

Last week, however, the company said its return to the black in the current quarter ending April 30 will depend on customer acceptance of new products, especially the new version of its flagship program IDMS/R supporting SQL-based on-line query and data retrieval.

## Toxics ruling hits chip makers

BY J.A. SAVAGE  
OF STAFF

California semiconductor and computer manufacturers using toxic chemicals, such as the arsenic gas and heavy metals used in chip making, will be required this week to begin warning their employees and surrounding communities that those chemicals may cause cancer and birth defects.

The warning requirements are a result of a 1986 California ballot measure aimed

at providing safe drinking water and implementing toxics enforcement. Despite heavy industry opposition, the measure passed overwhelmingly.

Although the enactment was drafted by environmentalists, many say this initial phase will do little good. "It will only remind people who are otherwise unaware that they are dealing with dangerous chemicals," said Dennis Hayes, author of *Running Amok in Silicon Valley*, a forthcoming book about environmental hazards in the high-tech region of California.

Companies reported that they will probably fulfill the requirement for notification of the community by running monthly advertisements in local newspaper classified sections.

## Arthur Andersen opens CIM center

BY JEAN S. BOZMAN  
OF STAFF

EVANSTON, Ill. — Seeking to showcase and market its computer-integrated manufacturing (CIM) expertise to the MIS community, Arthur Andersen & Co. earlier this month opened a CIM demonstration center, sponsored by Northwestern University, in a 24-acre research park.

"We needed to create an environment, and a place, where people could come to examine CIM technology for two to three days," said James K. Burns, managing partner in charge of systems integration for Arthur Andersen's international organization.

The CIM center, called the Systems Integration Center, includes a demonstration area for factory-floor technology and a conference center for MIS and senior management teams from current or prospective Arthur Andersen clients.

### International site

Burns said the center will serve as Andersen's international site for systems integration research, CIM briefings for clients, multi-vendor CIM seminars sponsored by Arthur Andersen and training in CIM techniques.

No money need change hands at the Systems Integration Center. It will serve as a backdrop for Arthur Andersen's continuing activities in computer systems research, Burns said. For its part, Northwestern University plans to contribute its professors and resources to Arthur Andersen's CIM seminars at no cost.

"This research park is an opportunity for us to take good science and to make it go — through applications to business needs," Northwestern University President Arnold Weber said.

The center's exhibits will, however, underline Arthur Andersen's ability to mix and match offerings from various vendors. The four-story center houses a demonstration factory stocked with donated equipment from 35 hardware vendors, including IBM, Digital Equipment Corp. and Hewlett-Packard Co.



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## Olympian

CONTINUED FROM PAGE 85

mid-20s out of a passion for order and an interest in the construction industry that he developed as a student at MIT. Between the early 1970s and the early '80s, he said, annual growth always topped 30%, usually running between 30% and 100%. PSDI rarely ran an ad, Daniels said.

The software virtually sold itself — first to the construction industry, then to large utility companies.

Even customers' woes turned into profits for PSDI. When the 1982-'83 energy crisis "stopped construction cold, we went into outage maintenance, using

Project/2 to manage plants during their down cycles," Daniels said. When the government cracked down on utilities, PSDI again did prudently audits.

In 1980, the aerospace and defense sector discovered Project/2, and PSDI became project manager for the space shuttle program. Daniels assumed that his start-ups days were behind him.

"Brick wall"

"Then, suddenly, we hit a brick wall," Daniels said. "Suddenly, it was 'Here come the microwaves' and everything changed. This company was built on renting our software — all of a sudden, nobody wanted to rent software anymore. Project/2 started looking too hard to use and too expensive. We had to get into

gear and enter the low-end market — very quickly, and with a rather important product." Enter Qwikstart Professional.

Daniels started the microcomputer group that developed that product, hiring new developers and a new sales staff. But today, the two-culture concept is just a memory at PSDI. "We've discovered that we're dealing with complementary markets, not separate ones," Daniels said. "In fact, about 60% of our PC sales come from our mainframe customers."

DEC recently announced a System Co-operative Marketing Program agreement with PSDI, making the Cambridge company the first DEC partner able to sell hardware as well as software in the project management market.

On the same day, Oracle Corp. an-

nounced a renewed and intensified relationship with PSDI that will let the latter offer its users full-function Oracle relational data bases.

Even as the Olympics are helping PSDI expand the public image of its market, the company is expanding its marketing operations increasingly into Europe and Asia. "We're introducing project management to people who can't even say it," said Daniels, who projects that 30% to 35% of PSDI's revenue will come from overseas markets by the early 1990s.

"It's totally different — more like a retail business," Daniels said of life at the helm of the "new" PSDI. "From around 1974 to 1984 — that was more like a dream world. Now, we work for a living every day."



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## Cray

CONTINUED FROM PAGE 85

tem on its latest machine, the Y/MP/832 [CW, Feb. 15].

Cray, which has installed approximately 189 systems in its 16-year history, intends to support both operating environments on its Y/MP, X/MP, Cray-1 and Cray-2 systems. The firm does not expect to change its strategy when it unveils the Cray-3 and Y series, which it is expected to do within the next two years.

Some of the software-related funds will also be spent on computer-aided design packages for internal hardware development, Rohlfen noted. But Cray applications software development is expected to remain the province of third-party developers, a Cray spokesman said.

The increased emphasis on software R&D comes as Cray expands its traditional customer base from government and educational institutions to commercial users in the financial, telecommunications and manufacturing industries. Commercial users expect complete systems, not just technical organizations, which often write custom software, Rohlfen said.

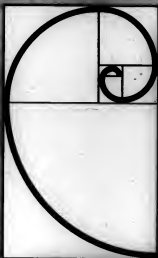
Gary Smaly, an analyst at Piper, Jaffray & Hopwood in Minneapolis, said Cray has no choice but to spend more on software if it is to diversify its customer base. "Future market opportunities will come from customers who typically do not do development in-house," he said.

In the firm's formative days in the mid-1970s, early customers such as the Los Alamos National Laboratory would devise their own operating system for Cray hardware. "When we started, we were a hardware company; our customers were able to take care of their own [operating] software needs. That's no longer true," Rohlfen said.

Last September, the company reorganized its software group under former Vice-President of Marketing Bob Ewald, who was named vice-president of software development. The changes occurred after the much-publicized departure of hardware designer Steve Chen to start his own company, Supercomputer Systems, Inc.

Increased emphasis on software development, in conjunction with its entrenched market position, should allow Cray to retain its advantage over Japanese rivals and near-supercomputer start-ups. Piper Jaffray's Smaly said. "There's a growing portfolio of applications that run on their machines that will help them maintain their high-performance lead," he said.

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## Wilder

CONTINUED FROM PAGE 85

nize deals at ADAPSO conferences is certain to raise a few eyebrows.

And the season to find partners. As lively as things have been on the acquisition front, this year's joint development partnerships have really been hopping. If politics make strange bedfellows—which we will certainly see as the presidential primary season unfolds—the computer industry is fashioning entire new beds.

Since the curtain went up on 1986, we have seen DEC with Apple, AT&T with Sun (much to the chagrin of several

key Unix vendors) and Microsoft with Ashton-Tate and Sybase. And let's not forget IBM with Steve Chen's supercomputer lab, even though that was struck last December.

Of course, technology partnerships are nothing new to the industry, but the rate at which major vendors are pairing up is notable. When rivals like Microsoft's Bill Gates and Ashton-Tate's Ed Esber share a press conference to praise each other, that's an eye-opener.

But each obviously perceives an even fiercer rivalry with Lotus. It's a lot like DEC and Apple sharing a big common enemy in IBM.

Why all the joining of hands? Look at the technologies involved. On several fronts, the industry is at the edge of de-

fining new standards.

The implementations of Unix, SQL and OS/2 in the next 24 months, for example, may very well define the shape of the industry for the next five years. Need less to say, no major vendor wants to be left on the sidelines.

That is the fear driving DEC, Apollo, Hewlett-Packard and others to ensure that AT&T and Sun don't walk away with a proprietary Unix that locks them out. Don't be surprised to see two or more of those companies strike Unix development deals together. In 1988, technological necessity is the mother of partnerships.

And also starring... IBM last week filled in a hole left by its big executive

shake-up and reorganization late last month. C. Michael Armstrong was named chairman of IBM World Trade Europe/Middle East/Africa, the post vacated by Kanper V. Gossel when he was named one of IBM's two vice-chairmen. Armstrong will remain president of the World Trade Group as well as president director general of IBM Europe.

It's a very logical promotion and doesn't bear scrutiny for implications like the last announcement of Big Blue executive changes. But if you're wondering, yes, 49-year-old Armstrong has moved up fast through the ranks and is a man to watch.

Wilder is *Computerworld's* senior editor, computer industry.

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## Ungermann-Bass

CONTINUED FROM PAGE 85

based on industry standards, according to a statement by Tandem President and CEO James Treybig.

"Tandem believes it will be a survivor as a full-line product supplier," said Sunde Peterson, minicomputer analyst for First Boston Corp. "To become that, Tandem must connect to IBM and DEC, and that's what Ungermann-Bass gives them."

Gerald Held, Tandem's vice-president of new ventures, said Tandem considered becoming an OEM outlet for a LAN vendor but saw a fuller strategic fit with Ungermann-Bass. "We find large corporations are shifting from small LANs to large networks of LANs," he said. "As people move to on-line systems, you need to tie them together."

### Merging networking firms

The merger is just one of an increasingly regular series of strategic partnerships between networking companies and larger computer companies, such as Unisys Corp.'s acquisition of Timeplex, Inc.

"It's eminently clear that networking has become a central part of data processing," said Glenn Pafumi, a technology analyst at Eberstadt Fleming, Inc. "But networking is still very difficult for an end user, so they're looking to their principal DP vendor to supply all things."

The merger fits neatly into the plans of Tandem's New Ventures Group, which was charged in 1985 with forging strategic business ties through joint ventures and acquisitions. The Ungermann-Bass deal is the second such alignment in the U.S. and the third overall.

"I think Tandem sees itself as a white knight protector of technology jewels," First Boston's Peterson said. "It's saying it will coddle the companies that it acquires; it won't rape and pillage the company on the first day."

The acquisition "preserves the integrity of both companies and gives Ralph Ungermann and his management a place to wander," added Harry Rosenfield, a communications analyst with Prudential-Beche Securities, Inc. "Plus, it enables Tandem to connect their computers to all kinds of different terminals."

The transaction has been approved by each firm's board of directors. Under the arrangement, Ungermann-Bass agreed to recommend its stockholders accept a cash tender offer by a newly formed Tandem subsidiary to acquire all 12.5 million outstanding shares of Ungermann-Bass's common stock at \$12.50 per share.



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We're looking for a few good slogans — witty, relevant, **SHORT** (these are small buttons), and at least moderately clean. You may send in your entries on the form below or a copy.

But you may **NOT** send us everything that comes into your head. Our offices aren't big enough to handle all that paper! Please take the time to narrow down your ideas to the two best you can come up with (test them on your friends).

All entries will be shown to our panel of judges, who will be tied to their chairs until selections are complete. Six winning slogans will be picked, and everyone who sent in one of those slogans will be eligible for a prize. If you are the only one submitting a particular slogan that wins, you, of course, get the prize. However, if more

than one person had the same intelligent idea, we'll pick the prize winner out of a hat. Prize winners will receive a \$100 certificate good towards the purchase of software from a friendly neighborhood computer store.

All decisions of the judges will be final, and no representations as to their competence, skill, or sense of humor are being made. All entries will become the property of *Computerworld*. Deadline for entries is **March 18, 1988** at our offices in Framingham, MA.

YES, I'd like to enter *Computerworld's* ridiculous button contest. My two slogans are written below. I understand the rules above, and realize that these entries will become the property of *Computerworld*. I hope your judges can read!

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Take a look at what *Focus* has planned for 1988.

## Computerworld Focus 1988 Schedule

Issue Date	Closing Date	Topic	Show Distribution
Jan. 6*	Dec. 4	Communications/Connectivity	Communication Networks
Feb. 3	Dec. 31	Software Operating Systems & Languages	Uniform
Mar. 2*	Jan. 29	Departmental Computing	Interface/WCC
Apr. 6	Mar. 4	Data Security	
May 4	Apr. 1	Communications/Connectivity	Comdex Spring/ICA
June 1*	Apr. 29	PC End User Productivity	PC Expo
July 6	June 3	Software	
Aug. 3	July 1	Departmental Computing	
Sept. 7	Aug. 5	Communications	TCA
Oct. 5	Sept. 2	Software Productivity	Info '88/Despo West
Nov. 2	Sept. 30	PC/Connectivity	Comdex Fall
Dec. 7	Nov. 4	Departmental Computing	

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# COMPUTER CAREERS

## Analysts' role definition murky

Opportunities abound for those who possess business, analytical expertise

BY ALAN RADDING  
WINDY CITY



The role of the systems analyst may be the least well-defined job in the computer industry. Programmers write code, MIS managers manage, but what exactly do systems analysts do?

While there may be disagreement over the particulars of the position, there is unanimity about opportunity.

"Demand is rising dramatically because of the missing ingredient — strong business analytical skills," says Martin Joyce, a partner in software development and networking services at Coopers & Lybrand's Boston office. Because of the expansion of computer technology, "There aren't enough mid-level people to go around," he reports.

"The problem is finding people who understand both business and computers," says David Block, MIS director at American Bakeries Co. in New York.

### Downside high

Joyce agrees that the person who is "steeped in technology and can become an expert in the particular business" will find a great demand for his services.

The exact nature of the sys-

tems analyst's job varies according to the size of the organization, its computer sophistication, the style and approach of the company in general and the particular industry in which the company operates. Systems analysts might specify the system, write code and operate as business consultants.

"The systems analyst is someone who is well versed in a specialty from an applications standpoint and can work with users to define and develop system specifications for programmers and programmers/analysts," says Jim Conda, manager of Source EDP in Burlington, Mass.

At Coopers & Lybrand, a systems analyst understands financial services and possesses technical sophistication.

American Bakeries' Block prefers systems analysts who were programmers or, at least, are familiar with programming. The systems analyst must thoroughly comprehend the actual business, Block says, but "programming knowledge gives him scope and understanding."

In a small shop, the systems analysts are also the programmers. At William H. Sadler, Inc., a New York book publisher, systems analysts each work with their own group of departments to develop specifications and they then write the code, says

MIS director Robert Kinney.

Because the job description for a systems analyst is so broad and varied, so too is the educational background required.

"Most companies want peo-

ple with bachelor's degrees in computer science, although many may also possess a business degree and take computer courses along the way. Leary says that the MBA usually is not required by a hiring company.

Entry-level salaries start in the \$20,000 to \$25,000 range; those with an advanced degree and some business experience can start at more than \$29,000.

### How much you can make

1,500 MIS professionals rate systems analyst's annual salaries for selected metropolitan regions



ple with some kind of business background and computer science education." says Brian Leary, industrial relations management consultant at Robert Kleven and Co., a recruiting firm in Lexington, Mass.

Generally, systems analysts

Salaries for senior people can reach above \$40,000, but systems analysts generally do not make \$50,000 unless they reach a supervisory level. The career path for a systems analyst may well lead to supervision, as a project leader, for example.

Because systems analysts are expected to possess a strong general business orientation and must acquire detailed knowledge of business operations, some recruiters say analysts are well positioned to move into general management.

### Management path

"It's definitely a path to management. You get a good, broad understanding of the organization," Leary says. A systems analyst can "make a good impression on management."

At American Bakeries, Block sees good systems analysts moving toward computer systems management. "They'll go to higher levels of DP management and not necessarily move into general management," he says.

The experience of a computer-driven marketing firm in suburban Boston has led management to conclude that "typically, good programmers make terrible system analysts," says a senior account manager who supervises systems analysts for his clients' projects. The misperception with programmers who become systems analysts, he says, is that "they lack the user point of view."

Some companies, like Sadler, prefer to train their systems analysts in-house, while others, like American Bakeries, expect that all but entry-level candidates will be able to quickly get up to speed without much hand-holding.

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Since LAI began advertising in Computerworld, the company has gone from 50 to 130 full-time professionals. "We've been in Computerworld about every other week. And with the company's plans for growth for the next five years, we're going to continue advertising in Computerworld," says Roger.

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What I'm seeing, thanks to Computerworld,  
is beyond our expectations."



— Max Steiner  
Director of Marketing  
Kenda Systems, Inc.

**M**ax Steiner remembers his days as a salesman, when he would make calls and, invariably, see a copy of *Computerworld* on the desks of his clients. That alone made an impression on Max.

Today, he is Director of Marketing for Kenda Systems, a software services firm with offices in New England, New York and Washington, DC, and specializing in placing contract engineers within the high-tech industry. Having grown by 400 percent annually for the last three years — and having placed several hundred professionals in less than three years, Kenda Systems is an acknowledged leader in the industry.

The impression that *Computerworld* has made on Max early on has been a lasting one. He directs Kenda's advertising. And he directs it to *Computerworld*.

"We are looking for national exposure. First, we want to make people aware of Kenda Systems and then increase the number of resumes sent to us. I believe that greater recognition will lead to greater interest — and understanding of what we can do for people.

"It only follows that we can best accomplish our goals by advertising with the industry leader — it answers all our needs. *Computerworld* reaches the qualified software professionals we're looking for.

"And we have the proof. We've seen as much as a 30 percent increase in resumes coming into our offices. Plus we're getting everything we hoped for: national recognition and responses from top people from all over the country. Clearly, we're quite pleased with the results.

"We're hearing from software engineers who are impressed with the fact that Kenda's in *Computerworld*. The bottom line is results. What I'm seeing, thanks to *Computerworld*, is beyond our expectations."

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**D**ave Grinnell is Vice President and Advertising Director of Source Services Corporation, the parent company of Source Edp, the world's largest recruiting firm that specializes in the computer profession. Source Edp has been an advertiser in Computerworld — almost from inception of the publication. Here's why:

"With its fantastic pass-along circulation, Computerworld not only reaches executives in computer management, but programmers, systems analysts and other individual contributors that are in particular demand by our client firms. It helps us reach the heart of our candidate base efficiently."

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# "We filled 75% of the positions with responses from our first ad in Computerworld."



Bjorn Nordemo  
Vice President  
Data Arts & Sciences, Inc.  
Weston, MA

**B**jorn Nordemo is Vice President of Data Arts & Sciences, Inc. (DASI), a contract software agency based in Weston, MA. Although they place people in permanent positions, DASI most often places "contract programming personnel" — consultants who fill special niches for short or long term commitments in corporations in the New England area.

"Our agency specializes in finding computer consultants — designers of systems, evaluations of hardware and software requirements, and computer programmers to mention a few. We recently were introduced to Computerworld as a potential source for finding these consultants," states Bjorn. "I liked the idea because I know Computerworld has a broad reach — from MIS/DP directors to computer programmers, in multiple industries and multiple markets — and that's what DASI needs."

"We had four specific positions for MIS/DP consultants that we needed to fill in northern New England. We used the local newspaper on a weekly basis, but people who are willing to move usually aren't reading the local Sunday paper. So, I felt this was a perfect opportunity to try Computerworld," says Bjorn.

According to Bjorn, he's quite satisfied with the results. "From Computerworld, we filled 75% (3 out of 4) of the positions with the responses from the first week, and the remaining position with the response from the following week. These results alone made my ads in Computerworld worthwhile."

And Bjorn also recognizes a second benefit to advertising in Computerworld. "The beauty of using Computerworld is that it's read by people in the computer industry who have a need for consultants, as well as being read by consultants who need to keep up to date on the marketplace," says Bjorn. "So we not only reach qualified candidates to fill our current openings, but we are creating awareness of the services that DASI has to offer," says Bjorn.

"We have some great plans for expansion and as we do, Computerworld is going to play a strong hand in helping us accomplish our goals," concludes Bjorn.

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Senior Vice President/  
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Thompson Recruitment Advertising

**M**ichael Gill is Senior Vice President and Creative Director of Thompson Recruitment Advertising, based in Los Angeles, California. In 1986, Thompson won more EMA awards than its three largest national competitors—combined. The company's advertising goal is a simple but demanding one: To create the most effective recruitment advertising in the marketplace.

Thompson can point to many reasons for its success. And one of the first that comes to mind, Michael says, is Computerworld and its Employment Today section.

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# MARKETPLACE

## No supply woes for PC, Mac

IBM, Apple, Compaq micros lead the way to new trading record

BY ELIZABETH LOZANO  
SOUTH COMPUTER EXCHANGE CORP.

The used microcomputer market experienced heavy trading in the week ended Feb. 12, as supply conditions improved for IBM Personal Computer and Apple Computer, Inc. Macintosh Plus buyers.

IBM's PC XT Model 089 and PC AT Model 339, Compaq Computer Corp.'s Deskpro 386 and Apple's Mac Plus led the way in sales as the market set a new high in trading volume for the year.

The AT Model 339 remained a hot commodity on the Big Board. This model, complete with a monochrome monitor and adapter, closed even at \$3,350, trading under more favorable supply conditions than it has previously.

The less powerful AT Model 099 closed up \$50, at \$2,350, with machines appearing in only small quantities. The XT lines performed well throughout the week, closing on an average of \$60. The XT Model 089 brought

a price of \$1,750, and the Model 086 traded at \$1,350.

PC buyers expressed pleasure with the increase in availability during the week. The two-disk drive IBM PC Model 076 closed even at \$900, with demand evenly matching supply.

**A**LL THE Mac wizards will probably not be able to perform their magic with this machine, and sales will continue to be low until there is more software available for the Mac SE.

In the Compaq arena, the Deskpro 386 and the Portable III were in extreme demand during the second week of the month. The Deskpro 386 "wonder box" closed even at \$4,325, as new equipment vendors' dis-

count prices held this model's used value from rising.

The Portable III traded up at \$2,725, experiencing a supply shortage. In contrast, Portable II supply conditions improved during mid-week, leading this machine to trade at a marginally lower price of \$1,650.

Compaq's first claim to fame, the Portable I, brought a price of \$750 during the week. Overall, the unit experienced steady market conditions. Market players predict continued success for the Houston-based manufacturer, as used market demand is currently growing exponentially with Compaq's new equipment sales.

### Macs stay even

The Mac Plus traded actively early in the week. However, this popular model ended up closing even, at \$1,250. Volatile supply conditions forced trading volume down toward the end of the week.

The Mac 512 and 512E closed even as well, at \$825 and \$975, respectively, with a steady supply to meet demand.

## The BoCoEx Index

Closing prices report for the week ending Feb. 12, 1988

	Closing price	Recent high	Recent low
IBM PC Model 076	\$900	\$975	\$475
XT Model 086	\$1,350	\$1,800	\$750
XT Model 089	\$1,750	\$1,875	\$1,000
XT Model 096	\$2,250	\$2,400	\$1,900
AT Model 339	\$3,350	\$3,500	\$2,400
Compaq Portable I	\$750	\$975	\$600
Portable II	\$1,650	\$1,900	\$1,275
Portable III	\$2,725	\$2,850	\$2,175
Plus	\$1,250	\$1,400	\$975
Deskpro 386	\$4,325	\$4,500	\$3,850
Deskpro 386	\$4,325	\$4,500	\$4,000
Macintosh 013	\$625	\$800	\$675
013SE	\$975	\$1,075	\$800
Plus	\$1,250	\$1,300	\$950
SE	\$1,875	\$2,150	\$1,700
II	\$4,500	\$4,500	\$3,500

INFORMATION PROVIDED BY THE SOUTH COMPUTER EXCHANGE CORP.

The newer Mac models, the SE and the Mac II, experienced opposite conditions. The SE closed at \$1,875 with an increase in demand, and the MacII closed at \$4,000 with a decrease in demand.

All the Mac wizards will probably not be able to perform their

magic with this machine, and sales will continue to be lower than anticipated until there is more software available for the Mac SE.

The Boston Computer Exchange can be reached at 800-BOCOEXX or 617-542-4414 in Massachusetts.

## Availability of IBM storage devices varies according to who is buying

BY ROBERT GALLERY  
IBC FINANCIAL SERVICES CORP.

Activity on the secondary market for IBM 3380 storage devices has been lively. Many users are taking advantage of falling used prices by adding disk drives to their shops. However, many large users are opting to increase capacity and save floor

space by going directly to IBM for the newly announced high-capacity 3380 Ks.

Since mid-November, the 3380 AE has declined in value by 19%, and the 3380 BE4 has dropped 13%. This can be directly attributed to the availability and shipment of IBM's new high-capacity 3380 K model. Announced in September, the 3380

K offers 50% more capacity, requires an equivalent amount of floor space and promises increased performance when compared with the 3380 E.

With shipments of the 3380 K commencing, many users have replaced their 3380 E disk drives with this product. One way users seem to be making room for the direct-access storage device (DASD) is by disposing of their older equipment in the secondary market.

time to fall, the 3380 D models look less and less attractive. Prices of the 3380 AD have fallen 33% since mid-November. The add-on 3380 BD has fared slightly better, losing only 22% of its value during the same time period.

This trend is expected to continue as 3380 Ea values decline and IBM pushes sales of its new 3380 J models.

users took advantage of the inexpensive cost per megabyte and caused the supply of machines to dry up.

During the fourth quarter of 1987, the standard 3380s experienced their first decline of the year, with the 3380 AA4 falling 22% and the B4 falling almost 35%.

The supply of these models is increasing daily as users opt for

### IBM 3380 disk drives

Current fair retail market value

Model	Capacity	Current Price	High Price	Low Price
3380 AE	20 MB	\$1,200	\$1,400	\$1,000
3380 BE4	20 MB	\$1,100	\$1,300	\$900
3380 CE	40 MB	\$1,500	\$1,700	\$1,300
3380 DE	40 MB	\$1,600	\$1,800	\$1,400
3380 EE	80 MB	\$2,000	\$2,200	\$1,800
3380 FE	80 MB	\$2,100	\$2,300	\$1,900
3380 GE	160 MB	\$2,500	\$2,700	\$2,300
3380 HE	160 MB	\$2,600	\$2,800	\$2,400
3380 IE	320 MB	\$3,000	\$3,200	\$2,800
3380 JE	320 MB	\$3,100	\$3,300	\$2,900

INFORMATION PROVIDED BY INTERNATIONAL DATA CORP. OF CALIF.

### Ripple effect

As more and more users abandon their equipment on the secondary market, the supply of 3380 E models will likely increase, and prices will fall. This is sure to have a ripple effect on the rest of the high-capacity DASDs on the market.

Much like the effect a pebble has on a calm pond, falling prices at the high end of a product line ripple through to products of less capacity, speed or performance. This is the case with the 3380 D.

As 3380 E drives become more readily available in significant quantities, and prices con-

The 3380 J, announced in September, offers 2.5G bytes of storage, the same as the 3380 D, with faster access times, upgradeability to the 3380 K and quad pathing.

Contributing to the demise of the 3380 D are falling prices of the original members of the 3380 family of disk drives, the 3380 AA4 and the B4.

Throughout the first half of 1987 and into the fourth quarter, the 3380 standard drives, the 3380 AA4 and B4, remained very stable. Prices actually rose throughout the third quarter as

newer products in the 3380 family. Market research firm International Data Corp. expects prices of standard drives to continue falling throughout the rest of the year as prices of the Model E and D also decline.

With IBM aggressively marketing its new storage products, there will be many opportunities for users to save money by taking advantage of low prices on used equipment.

For more information, contact IDC Financial Services Corp.'s Terri LeBlanc at 617-872-8200.







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## IBM

FROM PAGE 1

announcement letters indicated.

Although the IBM announcement Monday adopted a conservative tone and called ESA/370 "an evolutionary step," Conti told a Yankee Group audience in New York the next day that ESA/370 was "a much larger step" than the one from MVS/SP to MVS/XA seven years ago. That move lifted the virtual memory ceiling from 16M to 3G bytes.

## Higher ceiling

ESA/370 will provide 16 terabytes of virtual memory for data storage, although program logic will still have to reside in the lower 2G-byte address space — as opposed to both data and program logic storage in MVS/XA virtual memory address spaces.

"That ceiling will satisfy customers' needs 'for more than seven years,'" Conti predicted.

The jump to terabytes of virtual memory puts the IBM operating system far ahead of users, a situation that was not the case seven years ago with the announcement of MVS/XA. The largest data centers store a maximum of 1 terabyte on their DASD, Conti acknowledged. Few companies have produced applications that break up against the 2G-byte limit of MVS/XA.

"We don't think we need more than 2G bytes yet," said

an MIS director at a New York firm listed near the top of the Fortune 500. Nevertheless, his technical staff was eagerly studying the IBM announcement.

"Obviously, what you need is what you could do if you had ESA/370 are two different things. This could open up our thinking as systems implementors," the MIS director said.

## What you don't know ...

Among other things, large users and mainframe software developers pointed out that the provisions of ESA/370 will allow them to be unconcerned about whether an application requires huge amounts of data or where that data resides as the application runs.

"The application programmer can load huge data bases rather than having to go [to] bring in the data," said Russell Artzt, who is senior vice-president at Computer Associates International, Inc. in Garden City, N.Y.

ESA/370's added virtual memory is limited to storing data as what IBM calls data spaces, unlike its predecessors, MVS/XA and MVS/SP. Under those two operating systems, virtual memory typically is divided into address spaces that can store anything from systems programming to application logic and data.

Joseph Farrell, vice-president of Applied Data Research, Inc. (ADR) in Princeton, N.J.,

said IBM has moved in the right direction.

"Users don't need more room for data base managers or application logic. They need room for more data," he said.

IBM officials said ESA/370 still uses a 31-bit address word, using pointers in additional hardware registers to close 2G-byte data spaces.



IBM's Carl J. Conti

"Through the use of some registers in silicon, we actually stack data spaces inside the machine horizontally, so we can deal with them in the machine," said Andrew J. Hunter, director of product support at IBM's Information Systems and Storage Group.

But the applications programmer deals with the data spaces as if they were in the form of logical virtual memory, with addresses increasing to larger and larger raw numbers, he said.

The creation of data spaces

captures virtual memory inside the CPU, eliminating time-consuming I/O and improving performance, Hunter said.

"IBM has extended the capability of data fetching to include expanded addressing without having to drastically change the instruction processing portion of their 370 architecture," ADR's Farrell noted.

## Close to others

Another indication of how close ESA/370 is to its MVS predecessors is the fact that it is composed of the combined enhancements in MVS/SP Version 3.0 and Data Facility Product, the MVS disk management subsystem, Version 3.0, according to the IBM customer announcement letters.

While DOS/VSE and MVS/SP shops have taken months to convert to MVS/XA, the conversion to ESA/370 could be accomplished in weeks, according to Conti.

Other features of the operating system include the following: • Hyperspaces, a special, high-performance form of memory making use of expanded storage; the internal CPU memory reservoir controlled by the operating system's paging supervisor.

One kind of hyperspace reserves a piece of expanded storage as an internal DASD to speed performance for authorized programs. Data stored in this form of hyperspace will not be subject to paging activity contention.

Another type uses expanded storage where available, backed by auxiliary storage, for storing data. Hyperspaces are different from data spaces in that data spaces can reside anywhere in processor storage or auxiliary storage.

• Data windowing services, from Fortran, PL/I, Cobol, C, assembler or Pascal applications, can access and scroll through data in virtual memory or large temporary data objects.

The window is defined by the user in a certain portion of the application that maps portions of that object. Data can be manipulated in the window by statements of the named languages.

## August ship

The MVS/SP Version 3.0 component of ESA/370 with IBM's JES3 is scheduled to be available in August at a one-time charge of \$163,200 for an IBM Group 30 processor and \$259,200 for a Group 40 processor.

MVS/SP 3.0 with JES3 reportedly will be available for the same processor groups at the same time for \$143,600 and \$231,600, respectively.

Data Facility Product Version 3.0 is scheduled to be available in December at a cost of \$54,000 for a Group 30 processor and \$86,400 for a Group 40 processor.

IBM also announced that VM/XA, previously announced for availability during the first quarter of 1989, will now be available in December.

## Mainframe

FROM PAGE 1

could hold 2.6 million 1,500-page books.

Analysts cautioned that while there may seem little need for 16 terabytes of memory, some users are now approaching the 2G-byte limit that seemed absurd when MVS/XA was announced. To take advantage of that capacity, IBM unveiled features to isolate data from application code within the CPU, thus making it practical to use expanded storage for data. The system-managed storage software is intended to hide from the user any need to know where data resides.

Describing the 3090, Carl Conti, vice-president of the Enterprise Systems unit, said, "When it comes to collecting massive amounts of information, organizing it and, most importantly, sharing it across an enterprise, there is no solution that can do it all."

The emphasis on the mainframe as a server for workstations is one result of IBM's renewed focus on communicating with its customers, said Michael Gersan, an analyst with The Niko Securities Company International, Inc. in New York.

"The tripod [IBM] used in its

original presentation of the 370, with the mainframe, the 370 and the workstation each being leg, has been partially undercut by the rate of change in microprocessors and the slow development of the 370," Gersan said.

Conti said PCs will drive user demand for mainframe storage and that technologies such as artificial intelligence, image processing and relational data bases require the storage capacities that new IBM mainframes will support. While the largest data centers today have 1 terabyte of data, he said they will have 500 terabytes in a few years.

Conti was the principal IBM spokesman during the announcement and a day later at a New York seminar on IBM directions, sponsored by The Yankee Group, a Boston-based market research firm.

Analyst Robert P. Tasker of The Yankee Group saw the IBM move as a step toward a two-tier environment in which there are corporate mainframes and application activity occurs on workstations at the expense of mini-computers, like the IBM 9370 and local-area networks.

"This is a continuation of the shifting of the mainframe that has been going on for a few years," said analyst Francis

Gens of market research firm International Data Corp. in Framingham, Mass. "They have been talking for a while about the mainframe as a big repository for data. Clearly, they have to look at the strength of PCs and the like and figure out what the mainframe niche is going to be."

Asked about the demand for more than the 2G bytes of memory offered under MVS/XA, Gens noted that when the earlier operating system was announced in 1981, 2G bytes seemed like more than anyone could ever need. Now, large-systems customers are nearing that limit and may panic it when they restructure systems to take advantage of MVS/ESA, he said.

The next steps for IBM, according to analysts, are continuations of its recent ones. They expect faster processors, enhanced subsystems, such as an IBM DB2 to take advantage of MVS/ESA, and up to quadrupled CPU storage with the introduction later this year of 4M-bit memory chips.

Meanwhile, IBM plug-compatible vendors National Advanced Systems and Amdahl Corp. already promise support for ESA by saying they will support product lineables after IBM releases MVS/ESA specifications in four months.

## No rush to registers

BY JEAN S. BOZMAN  
OF STAFF

Several large IBM user sites are apparently in no hurry to embrace IBM's new Enterprise Systems Architecture/370 (ESA/370). Following last week's announcement, several MIS managers said they are inclined to wait for the next generation of IBM 3090 hardware that might take full advantage of the MVS/ESA operating system.

"We're not chomping at the bit for ESA/370," said Nick Simola, executive director of information systems at Chrysler Corp. in Detroit. "I'm never a pioneer in early software of that kind, anyway."

Most of those surveyed said they see themselves moving toward ESA — in time. "It's an enhanced MVS/XA that we will inevitably have to go to," said an information manager at a Bell operating company. "We don't know what the system overhead will be, and neither ... do our team of IBM representatives."

Users appeared excited by the prospects of virtually unlimited address space but they are unsure of which 3090 config-

uration will allow them to implement it.

"ESA/370 fixes some problems that we have now," said Pete Miller, senior vice-president of data processing at First National Bank of Chicago, where four 3090s are in operation. "We don't need trillions of bytes of extra address space, but we'd surely like more than the current 16M-byte limit."

"It's like the tip of the iceberg," said Steve Matthey, who is in charge of data management for Nielsen Marketing Research, Inc.'s two 3090 sites in Green Bay, Wis.

Users at mixed sites said they will wait to see what plug-compatible manufacturers Amdahl Corp. and National Advanced Systems (NAS) announce in response to MVS/ESA.

"We were contemplating a conversion from MVS/SP to MVS/XA," said Dave Jacobs, manager of data processing operations at Ingersoll Milling Machine Co. in Rockford, Ill., which replaced a 3090 Model 200 with a NAS XL/70 in 1986. "This Enterprise operating system is just throwing another element into that decision."

# IBM outlines PS/2 pricing strategy

BY ED SCANNELL  
OF STAFF

BOCA RATON, Fla. — IBM laid out an ambitious plan last week to aggressively drive up price/performance marks on its Personal System/2 line, saying it will introduce more powerful versions of every member of the PS/2 family during the coming year.

At a lavish seminar staged to pump up enthusiasm for its Micro Channel architecture and OS/2 operating system, IBM said it will deliver the following products:

- Intel Corp. 80286-based systems priced at the current level of the PS/2 Model 30, or about \$1,500.
- An Intel 80386-based system priced between \$3,595 and \$6295, which is the current range for an 80286-based model.
- Systems based on the 386 costing approximately \$1,500 and scheduled for delivery sometime in 1989.

IBM will also deliver at least two intelligent subsystems with coprocessors that exploit the advantages of its Micro Channel architecture by Comdex/Fall '88. The company is working on a file management subsystem based on the small computer system interface, a graphics subsystem, a numeric coprocessor and various communications products.

## First things first

"The things we'll focus on first are communications cards, because they have a high level of interrupts that can be best serviced not by the main engine but by an intelligent subsystem," said Frank King, vice-president of IBM's Entry Systems Division.

IBM, which is trying to shake its image as a pricey personal computer supplier, will maintain the current price points of its PS/2 line, which range from \$1,350 to \$13,000, but will add



IBM's Lowe

faster processors and more functions at each price point, according to Bill Lowe, president of the Entry Systems Division.

"Our objective is not to get the product line down to \$600. I expect our entry points to remain where they are but with improved function," Lowe said. "The high end may continue to go up [in price] as we add more function."

IBM has also accelerated its development schedules and will introduce as many new systems this year as it did in 1987, when it announced 11 processors. The firm will have two major announcements a year during the next two or three years, Lowe said. He added that IBM's development team is on a six- to 12-month development schedule.

IBM has been offering a sleeker version of its PS/2 Model 50 to key customers during the last few months, Lowe admitted. The company has not announced the system formally because it cannot manufacture enough system parts to meet demand. He said the firm's plants will meet current demand by the end of the first quarter.

By mid-year, IBM will have a 3 1/4-in. hard disk drive that can handle 100M bytes of storage and a 5 1/4-in. drive that handles up to 600M bytes. This will allow the PS/2 Model 80 to serve as a more effective departmental OS/2 file server, Lowe said.

Delivery of a series of more powerful systems is not IBM's

top priority for this year, however. Both Lowe and King said acceptance of OS/2 is the key factor in helping both IBM and the microcomputer industry grow during the next three to five years. Central to OS/2's acceptance are applications from major vendors, of which there have been precious few so far. IBM and Microsoft Corp., however, believe that 1,000 applications will be available for OS/2 by early next year, Lowe said.

IBM has apparently softened its longtime ambition to be a major force in the microcomputer or software applications market. Although King said IBM's Advanced Application Division is working on a range of "software that integrates the office function," Lowe said the company will largely depend on third-party developers to deliver key OS/2-compatible software.

As important as the delivery of OS/2 is AIX, the company's Unix operating system for its 80386-based systems, and developing a platform for running IBM System/36 applications under OS/2 (CW, Dec. 14, 1987). Both will be done before the end of this year, Lowe said.

## In the works

In other hardware-related projects, IBM said it is also working on the following:

- A removable read-write optical disk drive, to be delivered in early 1989, that will help the company gain a foothold in markets such as image processing.
- A 12 million instruction per second graphics processor aiding the performance of IBM's Presentation Manager.

In discussing the reasons for and the potential of the Micro Channel, King said the architecture was created to allow a PC to connect to a variety of hardware devices and local-area networks, not to run multiple on-screen software applications.

"What we are finding is that users who stress communications and new applications like image processing increase dramatically the number of things they want to do concurrently," King said. "We are seeing more configurations where they want to attach to several LANs or hosts."

# Gaps in 3090 line filled up

BY STANLEY GIBSON  
OF STAFF

IBM filled cracks in its flagship 3090 line last week, adding a dual-processor version of its Model 180E, the 280E, and a five-processor system, the Model 500E.

IBM also announced two 4381 models that will take advantage of the MVS/ESA operating system the company announced last week. Those models, the 4381 Models 91E and 92E, are based on the 4381 Models 23 and 24 and offer comparable power.

The models and enhancements came at a time when many industry observers expected IBM to boost the power of the 3090 line by about 20% with the so-called F models, a second

hicker in the 3090 line's life span following last year's E models.

The announcement stopped short of such an overhaul, however. IBM officials said further 3090 enhancements are in the offing but will not be forthcoming in the first half of this year.

"We are just seeing IBM take some of the steps to build on the new architecture, MVS/ESA. The other steps are going to be seen along the way and will grow into the 'Summit' series," said Steven Josselyn, a large-systems analyst at International Data Corp. in Framingham, Mass.

The 3090 Model 500E is configured with three processors on one side and two on the other. It can operate as a single-image or physically partitioned configuration.

Priced at \$4.9 million for an average configuration, the Model 280E will be available in the second quarter. The Model 500E, priced at \$9.7 million for an average configuration, will ship in the third quarter, IBM said. The 4381 91E is priced at \$550,000. The 4381 Model 92E is priced at \$920,000. Both models will ship in November.

## Tale of the tape

New IBM E models fill holes in mainframe product line

Model	Processors	FPU's	70.4	90.7 million	200 MIPS
3090 280E	Two	38	38	\$4.9 million	Q2 1989
4381 91E	Two	8.1	8.1	\$550,000	November 1988
4381 92E	One	4.8	4.8	\$920,000	November 1988

\* Millions of instructions per second; CPU estimates based on vendor-supplied information

INFORMATION PROVIDED BY IBM  
ON CRYSTAL

# IBM adds high-end facilities

IBM's announcement last week included two major facilities for its mainframes: automatic storage management and the capability to partition IBM 3090 mainframes into as many as eight logical processors.

The firm also trimmed prices on expanded memory 8M to \$370,000 for the first 64M bytes; additional 64M-byte increments were reduced 22% to \$225,000.

Data Facility Storage Management Subsystem (DFSMS) can improve programmer and user productivity, IBM claimed, by automatically determining what data is to be stored on each storage device in a DFS shop. DFSMS is composed of a new MVS/Data Facility Product (DFP) Version 3 and other products of the Data Facility family, together with the firm's Resource Access Control Facility data security product, IBM said.

IBM said MVS/DFP Version 3 will make it easy to migrate to new direct-access storage devices (DASD). Although IBM did

not elaborate on specifics, the product should make it easier to move to the next generation of IBM DASDs than it was to move from IBM 3350 disk drives to 3380 models, said David Violante, a storage systems analyst with International Data Corp. (IDC) in Framingham, Mass.

DFSMS will be available in December, IBM said.

IBM also announced Processor Resource/Systems Manager (PR/SM), a facility that partitions a single 3090 central processing unit into as many as four separate processors. The 3090 line's multiprocessing Models 280E, 400E, 500E and 600E can have each of their two sides partitioned into four processors, yielding a total of eight processors.

PR/SM is available on all 3090E model processors at prices ranging from \$60,000, on the Models 120E, 150E and 180E, to \$200,000, on the Model 400E. The feature is set to be generally available in August.

STANLEY GIBSON

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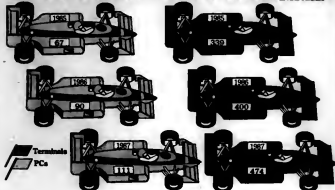
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## TRENDS

## Terminals vs. PCs

## Micros making a move at mainframe sites

AVERAGE NUMBER OF TERMINALS AND PCs INSTALLED AT SITES WITH IBM 370-CLASS AND COMPATIBLE MAINFRAMES



**T**erminals in major data processing sites are slowly losing desktop share to personal computers, according to a study by Focus Research Systems, Inc. in West Hartford, Conn. Focus gathered statistics from 7,150 locations that have IBM 370-class or compatible mainframes.

The figures show that during the last several years, corporate purchasers have been planning to buy an increasing number of terminals relative to PCs. But when the final purchase figures were tallied, those corporations had instead bought an increasing number of PCs relative to terminals. The result is that the ratio of terminals to PCs has been narrowing since 1985, as corporations put more and more intelligent workstations in the hands of end users.

In 1985, the average number of terminals at the sites surveyed was 339, while the average number of PCs stood at 67—a ratio of about 5-to-1.

In 1987, the average number of terminals had increased to 474, but the average number of PCs had climbed to 111—a ratio of a little more than 4-to-1.

Firms in 1986 planned to purchase two terminals for every one PC and, in 1987, increased that ratio to about 2½-to-1.

The movement to PCs is not sudden or radical. Terminals are still multiplying at a healthy rate, according to the Focus study. But the trend to put more intelligence on the user's desk top continues, despite the apparent availability of large corporations.

STANLEY GIBSON

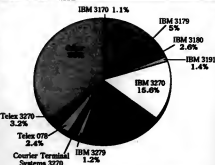
## Terminals figure in future

AVERAGE NUMBER OF TERMINALS AND PCs PLANNED FOR ADDITIONAL IBM AND COMPATIBLE MAINFRAME SITES



## Terminal market wide open

TERMINAL MARKET SHARE



INFORMATION PROVIDED BY FOCUS RESEARCH SYSTEMS, DIV. OF CHARTER FRAME, C. OGDEN, ILL.

## INSIDE LINES

Early warning system. Was it insight or incompetence? Only Apple knows for sure. Macintosh systems set up at Design East 86 last week to guide attendees through the Apple-DEC connection exhibits listed Network Innovations as an Apple subsidiary. A Cupertino, Calif., neighbor of Apple's, Network Innovations recently introduced CIL, a connectivity language for Mac-to-VAX applications, and was featured prominently at Apple's press conference and in Apple Chairman and CEO John Sculley's keynote speech. Ed Forman, marketing director for Network Innovations, declined to comment on any possible involvement by Apple, and the computerized listing was later edited.

Headwinds collide. Will the M\*A\*S\*H crew be reunited now that Alan Alda has signed on with the IBM marketing campaign? In television ads scheduled to run during the Calgary Olympic Games this past weekend, Alda was to be the point man for the electronic version of "The Big Picture" campaign, which has recently lashed major newspapers with a weak of gray ink. No word on whether he'll join his former cohorts, who already swapped their sweat- and blood-stained fatigues for the white-collar-and-the environment of the modern business office.

Micro retail-channel architecture. According to our source, Tandem is preparing 100 hand-traded clones of IBM's PS/2s to distribute to computer centers for demonstration purposes only. Apparently, the angle is to show customers that Tandem can do the job and, given enough interest, offer the clone for sale.

Serving many masters. Lotus's approach to the data base market is to both develop front-end tools and polish up and market an SQL engine licensed from Gupta Technologies. Now, Lotus officials are saying that the front-end tools, which include 1-2-3G and Provenance, will be available for other popular SQL engines. Key candidates would include Oracle, IBM's OS/2 Extended Edition and maybe even the SQL Server from archival Microsoft.

You can't keep a good geek down. It was revenge of the nerds time at the recent Uniform 1988 show in Dallas. It seems that midwestern Unit juries had it in for the Ransley Hotel. The children of the Korn synchronized their watches and put their room key cards in the slot-and-operated locks at the same time, causing a breakdown in that system. Some hacker also broke into the hotel's computer system, our source reports.

Crayetel. Convent Computer, the Richardson, Texas, maker of Cray-compatible minisupercomputers, is set to announce its next-generation processor, the C-5, on March 1 in New York. The product follows by a month archival Alim's replacement of its product line. Convent, which now uses a vector processing architecture, is expected to use a parallel architecture for the first time. Convent has acknowledged that the new computer will be three times as powerful as its current product and will be priced between \$500,000 and \$750,000.

How high is up? With 4066-, 10086- and even 20086-byte storage drives becoming the rule, DEC is reportedly hurrying the midnight oil working in-house on a 50086-byte half-height storage device that it will show to key accounts. If the work pans out, it will nearly double the capacity of its current internally developed high-end 5¼-in. drive, the 20086-byte RA70 that will be used in its new Microvax 3000 series.

New kid on the block. One more challenger is training to step into the ring for the heavyweight free-for-all with supercomputer powerhouses Cray, Control Data and Japan, Inc. Concurrent Computer said it has completed its five-month evaluation and is moving ahead with technology based on Princeton University's Navier-Stokes Computer. The project is aimed at fluid dynamics modeling and combines parallel processing and pipelined computing.

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